PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

Vol. CVIII, No. 10 Thursday, March 9, 1939 Price Ten Cents

Wisconsin Employment Off as Payrolls Gain

Employment Rise In November More Than Offset By December Decline But Payrolls Increase Slightly—Nekoosa-Edwards Effect Settlement With Labor Board—Thilmany Sells Abandoned Tissue Mill — Trade News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., March 6, 1939—November gains in employment in the paper and paper products industries were wiped out by December declines, according to a statistical report issued last week by the Wisconsin Industrial Commission, Madison, Wis.

Ninety-three concerns reporting showed a total of 16,791 workers on the December payrolls, as compared with 17,150 in November. Payrolls, however, showed a slight increase, from $420,379 in November to $420,961 in December, with average hourly earnings of 60.8 and 61.1 cents respectively.

Paper box industries, with 1,338 workers and payrolls of $30,178 showed a loss of 3.9 per cent for December over November; paper and pulp mills, with 14,104 workers and payrolls of $357,911, a drop of 0.5 per cent; paper products, 1,529 employees and $32,872 in payrolls, 2.7 per cent.

Printing, publishing and allied industries in Wisconsin showed improvement, however, which was expected to be reflected in later gains for paper industries. There was a decrease of 1.5 per cent in number of workers in November as compared to October, but in December, there was a gain of 1.3 per cent.

Nekoosa-Edwards Accepts Labor Decision

Nekoosa-Edwards Paper Company, Nekoosa and Port Edwards, Wis., has settled its controversy with the National Labor Relations Board by agreeing to recognize three American Federation of Labor unions as bargaining agents, as ordered by the board.

A statement was issued by John E. Alexander, president, as follows:

"The Nekoosa-Edwards Paper Company has announced an amicable settlement and compromise with reference to the recent rulings of the Labor Relations Board.

"As a result of conferences held for two days with representatives of the labor board, the American Federation of Labor local unions will be accepted by the company as the bargaining representatives of the employes of the Nekoosa and Port Edwards plants, with no reinstatement of Romeo Plenge. Mr. Plenge waived all rights to reinstatement upon payment to him of his back pay in the sum of fifteen hundred dollars."

Plenge was dismissed from the company's employ September 10, 1937 and agitation was then begun by AFL unions for recognition. Labor board hearings were held in February, 1938, demanding recognition and Plenge's reinstatement.

The company's compliance with the NLRB order included "disestablishment" of the Nekoosa-Port Edwards Labor Union as a labor organization and agreement by the company to refrain from recognizing the independent union as an employee representation for bargaining or grievance negotiation. The company had previously recognized the union, following balloting by the employees. Claude Bowes, president of the independent union, announced his organization is not concerned with the settlement of relations between the company and the AFL locals, and will continue to hold meetings as usual.

Work Starts on Fox River Power Plant

A crew of 100 men is working at the site of the former Patten Paper Company mill at Kaukauna, Wis., preparing the channel to the Fox River for the new power plant of the municipal utility. An 85-foot channel is being excavated for a distance of 600 feet, and it will be flared out wider for the remainder of its 1,200 foot length where it empties into the Fox River. Most of the excavation is rock, which will be used to build the channel bank. A small crew has been assigned to protect the water supply of the Thilmany Pulp and Paper Company while the excavating is going on.

A controversy still rages between the city council and a newly organized Citizens Protective League, which is attempting to set aside approval by the Wisconsin Public Service Commission of a deal made by the city with the Green Bay and Mississippi Canal Company by which the city acquired certain lands in exchange for a contract granting the private utility the city's share of the Fox River flow before it reaches the municipal power plant. The exchange was designed to give the new power plant 100 per cent river flow.

Gerald Clifford of Green Bay, Wis., attorney for the Citizens league, has filed a brief with the commission contending the contract gives the canal company a power monopoly for the next 25 years. Joseph W. Lefevre, Kaukauna city attorney, is preparing a brief defending the city's action.

John Limpert Speaks on Industrial Relations

John Limpert of the Kimberly-Clark Corporation,

(Continued on page 25)

Canadian Paper Box Men Meet in Toronto

Two Hundred Representatives of Ontario and Quebec Paper Box Manufacturers Attend Annual Meeting of Canadian Paper Box Manufacturers Association—Abitibi Reorganization Plans Under Way — Mill News.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., March 6, 1939—The special annual meeting of the Canadian Paper Box Manufacturers Association, Inc. and the Toronto Carton Council was held at the Royal York hotel, Toronto, on February 27 and was attended by nearly two hundred representatives from all parts of Ontario and Quebec, including representatives from the National Paper Box Manufacturers' Association. At a directors' meeting, W. Filey was elected president of the Toronto Carton Council succeeding Bart Sproule. It was decided to meet in New York on June 11-14 in conjunction with the National Paper Box Manufacturers' Association, returning a visit made by that body to the Canadian paper box makers in Toronto some ten years ago.

Many Timely Addresses Given

Alan Mahchester, President of the Canadian Paper Box Manufacturers Association, gave an address of welcome and Bart Sproule extended greetings from Toronto. Walter E. Trum, of E. J. Trum, Inc., Brooklyn, N. Y. a past president of the National Paper Box Manufacturers Association, spoke on "Changing Trends in the Paper Box Industry," making special reference to color and design. His address was illustrated with examples of various packages which have been re-designed during the past few years.

Among the other speakers at the business sessions were G. M. Hobart, Somerville Paper Boxes, Limited, Toronto, on "Building an Organization and Training Executives"; R. P. Reid, Consolidated Lithograph Manufacturing Company, Limited, Montreal, on "My Experience with a Cost System in the Paper Box Industry"; Alan Manchester, Manchester Paper Boxes, Limited, Toronto, on "Criticisms of and Suggestions for the Canadian Paper Box Manufacturers Association"; O. R. Cosburn, of Cosburn, Pye & Company, Toronto, on "Important Factors Arrived at After Looking over 1938 Statements of Many Paper Box Companies"; C. V. Hodder, Toronto, managing secretary of the Canadian Paper Box Manufacturers Association, on "Comments on the Canada-United States Tariff Agreement and How It Affects Your Business in 1939"; L. P. Morrison, Automatic Paper Box Company, Limited, Toronto, on "Is Cooperation Between Competitors Valuable and Why?"; R. S. Dunlop, Dominion Paper Box Company, Limited, Toronto, on "The Fancy Box Trade and Its Higher Costs"; F. W. Fisher, F. W. Fisher Company, Limited, Toronto, on "Is the Set-Up Paper Box Business Losing Volume to Other Forms of Packages?"; G. W. Brown, Gair Company Canada, Limited, Toronto on "Some of the Problems of a Large Organization"; J. Tresidder, Tresidder Brothers, Limited, Hamilton, Ont., on "Can Storage of Paper Boxes be Reduced?"; Lindsay Thompson, Thompson Folding Paper Box Company, Limited, Toronto, on "Quality Merchandise—Is It Worth While and the Contributing Factors"; C. W. Stephens, Dominion Paper Box Company, Limited, Toronto, on "Meeting Today's Selling Problems.

Box Manufacturers to Convene in New York

A noon day luncheon was a pleasant social event during which Mr. Trum spoke on the coming World's Fair in New York and the convention of paper box manufacturers to be held in that city in June next. In the evening, a reception was tendered President Alan Manchester of the Canadian Paper Box Manufacturers' Association, and Mrs. Manchester. A vote of thanks was accorded Fred Fielder, of the Fielder Paper Box Company, Limited, Toronto, for the splendid arrangements he had made for the gathering in Toronto and President Manchester pinned a bouquet of orchids on Mrs. Fielder as a recognition of her cooperation. In the evening a successful banquet and dance was held.

Among the visitors from the United States were Walter E. Trum, Brooklyn, N. Y., past president of the National Paper Box Manufacturers Association, Wm. Kraeger, secretary of the National Paper Box Manufacturers Association, Philadelphia; Harry Roden, Director of the Association, New York; W. Fricker, of the M. D. Knowlton Company, Rochester, N. Y.; C. A. DeMay of Samuel R. Parry Machine Company, Rochester, N. Y. and Robert Minkow, of Minco Products Corporation, New York.

Ontario Safety Association Meets in March

The annual meeting of the Ontario Pulp and Paper Makers Safety Association will be held at the King Edward hotel, Toronto, on March 23 when reports for the year will be presented. It is understood that the report of D. B. Chant, Toronto secretary-engineer of the Association, will be a satisfactory one in that in 1938 the accident frequency in the mills was the lowest in the history of the organization while the number of fatalities have been the fewest with the exception of one year when the number was the same as in 1938. George Barber, of the Spruce Falls Pulp and Paper Company, Limited, Kapuskasing, Ont., is President of the Association and A. T. Whealy, of the Corrugated Paper Box Company, Limited, Toronto, vice president. The Association has been in existence twenty-four years.

Thomas Bradshaw Invited to Great Lakes Board

Thomas Bradshaw, of Toronto, who is a widely known financier and a former city treasurer of Toronto, has been asked to take a position on the board of the Great Lakes Paper Company, Limited, Fort William, Ont., and it is expected that he will accept. George L. Carruthers has been elected a director of the Interlake Tissue Mills Company, Limited, Toronto, succeeding the late Thomas A.

Weldon. He is a son of George Carruthers, former president of the Canadian Pulp and Paper Association.

Abitibi Reorganization Plans Under Way

Reorganization of the Abitibi Power & Paper Company, Limited, Toronto, continues to occupy attention in financial circles and recent advices are to the effect that there are at least two plans under way, both of which follow similar lines. One plan, it is stated, would give bond holders seventy-five per cent of their claim in first mortgage bonds and twenty-five per cent in second mortgage bonds, together with some common stock; holders of seven per cent preferred stock would secure six shares of new common per share and holders of six per cent would get four shares of new common; holders of new common would receive one share of new common for each share held. The other plan is stated to differ in details. These plans are in contrast with a recent reported proposal of one bondholders' group involving putting the property up for sale and giving both classes of shareholders three years grace to redeem their equity through purchases of stock.

A. L. Johnson, of the General Timber Company, Limited, Port Arthur, Ont., has been spending some time in San Antonio, Texas. The operations of his firm are only a fraction this season of what they were last. Some pulpwood will be peeled by the General Timber Company during the coming summer but the quantity has not yet been decided upon. Prices for pulpwood are down from last year as generally most of the paper mills have large stocks on hand. Prices on next year's delivery will depend largely on general business conditions. In regard to the proposed chemical pulp mill at the head of the Great Lakes, Mr. Johnson says this project is still in hand.

Returns to Crocker-McElwain Co.

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, March 6, 1939—It became known this week that R. Franklin McElwain, one of the best known papermakers in the country, had returned to the position of vice-president and general manager of the Crocker-McElwain company, after a retirement of 11 years.

He retired from active duty with the company on February 9, 1928 following a career which began as office boy in the Valley Paper company in April, 1881. During his period of retirement he has acted as consultant for a number of paper manufacturers. After his first job with the Valley, he spent eight years with a wholesale paper house in Minneapolis and returned to this city with the Parsons Paper Company in 1887. He rejoined the Valley until 1889 when he became associated with Clifton A. Crocker in the Crocker Manufacturing Company. After this company was merged with the American Writing Paper Company, he stayed on until 1903.

In association with Mr. Crocker, they established the Crocker-McElwain Paper Company and in 1913, bought the Chemical Paper Company merging the two concerns.

Mr. McElwain, whose home is in West Springfield explains his return to the harness with the statement, "There's something in the smell of bleach that draws one back to it."

John A. Wiener Gets New Patent

John A. Wiener of 81 West Seventh street, Oswego, N. Y., together with Frank A. Bromley of New Rochelle, N. Y., has been granted U. S. Patent No. 2146871 on a method of making decorative fiber board from cellulosic fibers, such as shredded spruce log, and ground wood screenings representing the over-size material screened out of newsprint stock. A sizing composition is added to adapt the board to stand the heat applied in forming. The mixture of fibers and size is consolidated cold under hydraulic pressure of about 140 lbs. per square inch. The wet board is then placed in a press between plates embossed with the pattern which it is desired to apply to the board, and heat of from 212 degrees F. to 300 degrees F. or higher is applied. By selection of the temperature and the ingredients of the sizing composition, which for instance may include a trace of sulphuric acid, a range of color effects in the finished board may be obtained. Marked contrasts of shade and color between parts of the board at different elevations are obtainable by providing properly located apertures extending through the pressing plates. The hot plates dry and impress the wet board at the same time. The wet board is kept in the hot press for from 50 to 60 minutes, and after the dried board is removed from the press it is then sawed and trimmed. The finished board is particularly suitable for a decorative thermal insulation. The higher temperatures of about 350 degrees F. produce less discoloration of the board than does a lower temperature of say 250 degrees F.

The finished board has not only the pressed-in pattern, but also lighter and darker shades of color due to the heat treatment, and presents a pleasing appearance.

Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., March 8, 1939 — The Government Printing Office has received the following bids for 6,250 pounds of 50 per cent rag, blue antique cover paper, 20 x 25: R. P. Andrews Paper Company, 8.87 cents; Mudge Paper Company, 10.47 cents; Barton, Duer & Koch Paper Company, 11.29 cents; Stanford Paper Company, 11.39 cents; and Whitaker Paper Company, 10.94 cents.

For 4,000 pounds (25,000 sheets) of 75 per cent rag, lithograph finish map paper: Graham Paper Company, 15.75 cents; Stanford Paper Company, 14 cents; Barton, Duer & Koch Paper Company, 11.98 cents; Butler Paper Company, 15.75 cents; Mudge Paper Company, 15.75 cents; and Old Dominion Paper Company, 15.988 cents.

For 1,000 pounds of 19 x 24 white stereotype molding paper: Standard Paper Mfg. Corp., 9.95 cents; Cauthorne Paper Company, 10 cents; and Russell Products Company, 11.5 cents.

Must Be Individually Marked

WASHINGTON, D. C., March 8, 1939—The Bureau of Customs has held that sheets of woodpulp board, including wallboard and insulation board, whether wall or laminated are required to be individually marked with the name of the country of origin under the provisions of the Tariff Act.

Chicago Prices Firm As Trade Marks Time

Midwest Paper Market Reports Demand Has Quieted Down With Prices Unchanged—Waste Paper Market More Active As Price of Mixed Papers Advances—Unemployment Tax Creates Discussion—Other News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., March 6, 1939—While predictions indicate the paper business will experience a material upturn within the next few weeks, or months at the latest, the industry continues to mark time in common with the general business situation. Market news during the week just passed was colorless with demand quieted down. Prices however remain firm and everything is in as good a shape as possible for any uptrend in business. Meanwhile, Chicago paper executives point to the optimistic news releases coming from the White House and from Cabinet members and are increasingly confident that Congress and the many State legislatures in session will adjourn without any further "body blows" to business.

Waste paper provided a bright spot during the week though mixed papers were the only items showing an advance. The market was fundamentally firm in marked contrast to the situation prevailing only a few weeks ago. Sulphite bonds were steady though demand was quiet here as in the entire bond and ledger line. Groundwoods were in fair shape though orders were reported less numerous. Newsprint remained unchanged. Book papers were a bit stronger though the noticeable improvement did not extend materially into the cover paper field. Krafts were about the same with orders slightly checked and the market structure holding appreciably firm.

Waste Paper Changes

According to local reports mill prices for waste paper for March show an increase in only one item, mixed paper, which was advanced $1 per ton to a current quotation of six dollars. A drop was recorded, it is stated, in white news blank, the prevailing mill price being $21, a drop of $2 from the previous month's figure. No change was reported in the mill prices for waste rags for the month according to local waste paper firms. A good balance in supply and demand is reported prevalent in the market and waste paper in general is quoted as "firm" in this area.

SAP-YES to Appoint Committee

The Monday, March 6, meeting of the Salesmens Association of the Paper Industry takes on more than ordinary importance, in that it will serve to properly induct the re-elected officers into office and to announce the committee chairman for the educational, social, golf and other standing committees for the coming year. The Association is reported pleased over the re-election of John Diggs as vice president of the division and of Frank Prentice as second vice president, as it also is over the re-election of J. H. Coy as president of the Ground Wood Association and over the excellent address delivered by another member, George K. Gibson, at the New York meetings. It is reported that the Salesmens Association plans to stress the educational features of its work during the coming year and also to feature more open meetings as a method of inviting larger audiences and to increase the scope and activity of the group.

Unemployment Tax Under Discussion

Whether or not the Illinois Legislature is to receive "agreed" amendments on its Illinois Unemployment Compensation Insurance act or not is as yet an undecided point as representatives of paper and other industries continue efforts to arrive at a compromise which will permit retention and stimulation of merit or "experience" rating in this State. It is reported that representatives of labor are desirous of changing the tax rates based on employment records from zero to 3.5 as they now stand, to 1 to 4 per cent, a situation which is likely to be costly to employers with seasonally unstable employment records if allowed to become a law. In other words, paper firms unable to further stablize their employment would be forced to pay in increased unemployment tax of ½ per cent under labor's proposal while those firms with perfect employment records would be asked to pay 1 per cent rather than to obtain the zero rating which now is contained in the Act. Illinois does not begin to pay benefits until July 1, so all sides are anxious to give a form of permanency to the Act prior to that time. Employers, in general, are urging that the upper bracket of the tax shall not be increased and that those with perfect employment records be allowed to pay only ½ per cent rather than the one per cent suggested by the labor interests. The matter is of extreme interest to a paper industry already handicapped by costly taxes and legislative restrictions and is being watched closely by the five major employer organizations of Illinois.

New Paper Milk Containers Banned

The Chicago Board of Health this week filed charges that the new paper containers for milk are insanitary and do not measure up to the standards set by Chicago's milk ordinance. The statement was filed by the city in federal court in the suit brought by the Fieldcrest Dairies, Inc. The city charged that the containers used are not non-absorbent, sterile or sanitary. The board denied that its refusal to permit paper containers to be used was unlawful and discriminatory as charged by the dairy concern.

At the same time proof that residents of fifty Chicago suburbs prefer the new paper container was seen this week in the sales records of three milk companies which, since last November, have been selling "packaged" milk through suburban stores. The Fieldcrest Dairies have had a sales increase of 40 per cent according to Fieldcrest officials. Further, they pointed out that University of Illinois and Northwestern university tests have shown paper containers to be better than glass bottles from the standpoint of protection from bacterial contamination.

Publishers' Contracts Discussed at Meeting

Newsprint Contracts of Hearst and Scripps-Howard Explained At Annual Meeting of St. Lawrence Paper Mills — Hearst Now Meeting Payments On Current Shipments—Negotiations Pending To Open Port Royal Mill.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., March 6, 1939—The Hearst debts and the Scripps-Howard newsprint contract were discussed at the annual meeting here of the St. Lawrence Paper Mills, Limited. A. F. White, vice-president and managing director, referring to the accounts owed the corporation by the Hearst organization (some $150,000), said the security of the various Canadian newsprint companies for the Hearst indebtedness was now greatly improved. Shares of the more important and more profitable Hearst companies, such as the Hearst Magazine Corporation, had been placed in trust with the Chase National Bank of New York for the benefit of the creditors and against the "frozen" credits. Hearst, he said, is now meeting payments for current shipment but it will be on toward the end of the present year before anything definite can be said with respect to the payment for shipments of newsprint made in the past. The situation was involved, Mr. White said, and much depended upon general business as well as the liquidation of extraneous Hearst assets.

Questioned by a stockholder, A. K. Cameron, president, said the contract with the Scripps-Howard Publishing interests which was lost by St. Lawrence Paper Mills to the Donahue Bros., Murray Bay mill, was for 40,000 tons and was given on an eight-year contract. St. Lawrence Paper Mills had the contract for a period of 10 years.

In regard to business, Mr. White said indications were that Brompton's newsprint business would show a slight improvement while the Kraft division is currently operating at 85 to 90 per cent of capacity, the liner board division at 60 per cent of capacity and the cylinder board division at 50 per cent of capacity.

Negotiations Pending on Port Royal Co.

Negotiations are still proceeding for the re-opening of the plant of the Port Royal Pulp and Paper Company at Fairville, N. B. The main difficulty is the guaranteeing of a bond issue for $200,000. The provincial government has indicated that it would accept responsibility for half the amount if the city would guarantee the remainder, but the latter maintains that it has already done a great deal to keep the mill operating and is adverse to guaranteeing more than 25% of the issue. The hope is expressed that the mill will be re-opened about the middle of April and operate continuously for at least five years, with shutdown for about a month in each year for repairs. Some 200 employees will be taken back on the payroll, and, according to the company, the expenditures by the mill on wages and other overhead would be more than a million dollars a year.

Sees Future of Paper Board Obscure

At the annual meeting of the Brompton Pulp and Paper Company A. F. White, president, said the outlook for the newsprint division was for moderate improvement during the current year over 1938, but the future of the board section was still obscure because of the possible effect of the new trade treaty with the United States. Last year the board department had an off season. There was a condition of excess stock in the United States and as business across the line declined, American products were dumped on the Canadian market at low prices, forcing Canadian makers to revise their prices downward.

The trade treaty provisions had aggravated the difficulties of the board makers. There still was over-capacity across the line and to date sales of domestic makers had continued to suffer adversely. Improvement in general business conditions might help the situation, but meanwhile, the company had been making representations to the Government for modification in the tariff cut.

Fraser Companies Report Loss

At the annual meeting of the Fraser Companies, Limited, K. S. Maclachlan, president, said the past year's results reflected a moderate recession in volume and price levels at the pulp and paper mills at Edmundston, N. B., and Madawaska, Me., very weak demand for rayon pulp and substantially reduced operations at the Restigouche bleached sulphite pulp mill, with moderate and reduced activity in the lumber division.

Operating earnings before interest, depletion and depreciation, fell to $1,986,528 from $3,051,796 in the previous year and $2,100,920 in 1936, but were still 2.23 times all interest before depreciation and depletion. After all interest of $890,076, depletion of $207,804 and depreciation of $907,000, there was a net loss of $18,352 for 1938, which compared with the 1937 record net income of $759,552, or $2.05 a share, after income taxes.

Despite the reduced level of earnings, the company was able to increase net working capital by $641,864 after applying $145,342 on improvements to plant and properties and reducing fixed liabilities by $277,825.

To Make Inner Soles at Russell

HOLYOKE, March 6, 1939—Work of installation of one unit which will manufacture a new pulp and rubber composition for use in inner and middle soles of shoes has been completed, in the former Chapin & Gould Paper Company plant in Russell, Mass., according to Supt. Morgan J. Vittengl.

The plant has been leased for two years by E. I. du Pont, Inc., and operations formerly carried on at Brattleboro, Vt., are being shifted to the Russell mill. Once normal production is reached, the plant will employ about 30 hands. There will be two machines known as board units and the third, called a paper unit. When normal production is reached, 10,000 sheets per week will be produced.

Financial News of Pulp and Paper Industry

Net Income of Hoberg Mills Drops — Fort Wayne Reduces Par Value and Increases Number of Shares—Increased Net Profit For U. S. Gypsum — Simplex Paper Reports Net Profit — Rhinelander Nets $118,139.

NEW YORK STOCK EXCHANGE

High, Low and Last for the Week Ending March 8, 1939

	High	Low	Last
Armstrong Cork Co.	49⅛	47	48
Celotex Corp.	17⅝	17	17¼
Celotex Corp., pf.	71	70	71
Certain-Teed Products Corp.	11½	10⅝	11⅛
Certain-Teed Products Corp., pf.	44	42	43
Champion Paper & Fibre Co.	29	28¼	28¼
Champion Paper & Fibre Co., pf.	101	100½	101
Congoleum-Nairn Co.	28¾	28¼	28¼
Container Corp. of America	14⅜	13⅜	14⅜
Continental-Diamond Fibre Co.	8⅜	8	8¼
Crown-Zellerbach Co.	13⅛	12⅜	13⅛
Crown-Zellerbach Co., pf.	88½	87	88
Flintkote Co.	29½	28⅜	29½
Robert Gair	3¼	3⅛	3⅛
Robert Gair, pf.	11⅝	11¼	11⅜
International Paper & Power	13	11½	13
International Paper & Power, pf.	45¾	42¼	45¾
Johns-Manville Corp.	97⅛	94½	97⅛
Johns-Manville Corp., pf.	130	128¾	128¾
Kimberly-Clark Corp.	25½	25½	25½
MacAndrews & Forbes	32	31	31½
Masonite Corp.	52¾	51¾	51¾
Mead Corp.	10⅞	10	10⅞
Paraffine Companies, Inc.	55	54	54
Paraffine Companies, Inc., pf.	102½	100¼	100¼
Ruberoid Co.	30	30	30
Scott Paper Co.	49¼	48½	49¼
Scott Paper Co., pf.	115	114¾	115
Sutherland Paper Co.	30	29½	30
Union Bag & Paper Corp.	11	10½	11
United Paperboard Co.	6¼	6¼	6¼
U. S. Gypsum Co.	103½	101	102½

NEW YORK CURB EXCHANGE

High, Low and Last for the Week Ending March 8, 1939

	High	Low	Last
American Box Board Co.	8¼	8	8¼
Brown Co., pf.	17¼	17	17¼
Great Northern Paper	37¾	37½	37¾
St. Regis Paper Co.	3	2⅞	2⅞
St. Regis Paper Co., pf.	54	54	54
Taggart Corp.	4¼	3⅞	4¼

Hoberg Mills Nets $66,728

[FROM OUR REGULAR CORRESPONDENT]

GREEN BAY, Wis., March 6, 1939—Net income of the Hoberg Paper Mills, Inc. last year totalled $66,728, a drop of almost two-thirds from the previous year when the net was $180,418, according to a statement issued by the company last week. Earnings were equal to $10.05 on preferred as against $27.18 in the preceding year, and to 31 cents on common as compared with $1.51. Preferred dividends of $38,826 were paid during the year.

Net sales amounted to $3,662,500 as against $3,645,092, while cost of sales totalled $2,915,227 in 1938 against $2,725,654 in 1937.

Operating income totalled $119,350, compared with $270,331. Current assets as of December 31, 1938 were $1,160,473 and current liabilities were $599,636. On the same 1937 date, current assets were $1,084,467 and current liabilities were $446,283.

National Container Nets $125,903

National Container Corporation and Wholly Owned Subsidiary, Air-depot Realty Corporation reports for 1938 as follows:—Net profit, $125,903, equal to 38 cents each on 330,482 shares of $1 par common stock, against $311,931, or 94 cents a common share.

Fort Wayne Reduces Par Value

Stockholders of the Fort Wayne Corrugated Paper Company have voted to reduce the par value of stock from $100 to $10 and increase the number of shares to 10 for each one share formerly held. "The only purpose is to make stock easier for the small stockholder to handle in trading," H. M. Treen, general manager said. Under the new stock arrangement the company has 220,360 shares outstanding, whereas it formerly had 22,036 shares. August Becker, a director, retired. He was replaced by William S. O'Rourke, Jr. Officers were all reelected. They are: Henry J. Bowerfind, chairman of the board; Frank P. Qoester, president and treasurer; H. M. Treen, vice-president, general manager and secretary; A. F. Stahlhut, assistant secretary, and J. N. Johnston, assistant treasurer.

U. S. Gypsum Nets $241,000

Sewell L. Avery, chairman of the United States Gypsum Company, told stockholders at their annual meeting in Chicago last week that net profit in January was $241,000, compared to $108,000 in the 1938 month. Sales were 20 per cent above last year, and in February sales were 13 per cent over the same month. Sales were 20 per cent above last year, and dent of Container Corporation of American, was elected a director to succeed Arthur Anderson, who resigned.

Simplex Paper Corp. Nets $21,008

The Simplex Paper Corporation reports for the year ended December 31, 1938, shows net profit of $21,008 after provision for Federal income tax, equal after preferred dividends to 6 cents a share on 290,000 common shares outstanding. This compares with net profit of $110,715 or 37 cents per common share in 1937. Balance sheet shows current assets of $326,753, including $17,499 cash, $122,664 receivables and $186,589 inventories. Current liabilities totaled $169,723.

Rhinelanders Nets 79 Cents Share

RHINELANDER, Wis., March 6, 1939—The Rhinelander Paper Company made a net profit of $118,139 during 1938, according to a report issued to stockholders last week. This was equivalent to 79 cents per share on 150,000 shares of outstanding capital stock. A total of $217,347 was deducted for depreciation, depletion and amortization of patents. Net profits for 1937 totalled $240,293

Hawley Pulp Earns $87,801

The Hawley Pulp and Paper Company reports for 1938: Net income of $87,801, compared with $145,432 earned in 1937.

Obituary

Monroe A. Wertheimer

[FROM OUR REGULAR CORRESPONDENT]

KAUKAUNA, Wis., March 6, 1939—Monroe A. Wertheimer, chairman of the board of Thilmany Pulp and Paper Company, died early Wednesday, March 1, at his residence in New York City. He was also chairman of the board of the Longview Fiber Company, Longview, Wash., and president of the American Lakes Paper Company, Chicago, Ill.

Mr. Wertheimer was 76 years old. He had been president of Thilmany since its incorporation in 1901 until 1936 when he was made chairman of the board. He retired from active service at that time, and moved from Kaukauna, where he had resided for many years, to New York. Under his leadership the company grew from small beginnings to one of the largest specialty mills in the country, with eight paper machines, a 100-ton capacity kraft pulp mill, and converting departments equipped for the manufacture of bags, waterproof papers, waxed and printed wrappers and other items. The kraft mill was one of the first in the United States.

Mr. Wertheimer organized the Longview Fiber Company in 1927. It is equipped with four paper board machines, kraft pulp mill and converting plants.

He was born in Elyria, Ohio, February 2, 1863. He moved to California when a young man and entered the paper jobbing business in San Diego, supplying fruit wrappers to California growers. His chief source of supply was paper manufactured in Kaukauna by Oscar Thilmany.

Mr. Thilmany decided to retire in 1901 and return to Germany, his fatherland. Mr. Wertheimer headed a group which purchased the Thilmany interests and the present company was organized.

During the years that followed he became one of the outstanding men in his field and a leader in the development of new papers. He is credited with pioneering in this country light-weight string papers to replace the coarse, heavy grades.

Active in civic and social life, he was a trustee for many years of Lawrence College at Appleton, Wis. He was especially interested in the founding of the Institute of Paper Chemistry, affiliated with the college, and served as one of its first trustees. He was a charter member of the North Shore Golf Club and the Riverview Country Club of Appleton.

Mr. Wertheimer is survived by his widow and one son, Robert S. Wertheimer of Longview, Wash.

William H. Holden

William H. Holden, head of a paper firm bearing his name at 41 Park Row, New York, and for many years prominent in the paper trade, died Saturday at his home, 80 Whitehall boulevard, Garden City, N. Y., after an illness of about two weeks.

Active in politics and civic affairs, Mr. Holden formerly was a member of the village board and president of the Garden City Property Owners Association. He was vestryman of the Cathedral of the Incarnation and for many years was a member of the Crescent Atheltic Club.

Mr. Holden was born in Brooklyn and lived there for many years. He had been identified with the paper business for more than 55 years, having entered it as a boy with the old firm of Conrow Brothers. For about 18 years he was with Miller & Wright.

In 1916 Mr. Holden bought out Danforth L. Jones & Company and formed the firm of Holden & Hawley, which was taken over in 1926 by George W. Millar & Company. Mr. Holden remained with the Millar concern until 1931, when he established his own business on Park Row. He served two terms as president of the New York Paper Trade Association.

Surviving are his widow, and two daughters. The funeral services were private.

William E. Thompson

APPLETON, Wis., March 6, 1939 — William E. Thompson, who was associated with Appleton Woolen Mills for many years, died Wednesday, March 1, at his home after a short illness. He was foreman for a number of years and later became a salesman for the company. He was 70 years old. He was a brother of Charles D. Thompson, who has been traffic manager of the Fox River Paper Corporation for many years. Burial took place at Riverside cemetery here.

May Split Award for Distinctive Paper

WASHINGTON, D. C., March 6, 1939—The Secretary of the Treasury in the Treasury Department appropriation bill in order to foster the manufacture of distinctive paper for United States securities has been authorized splitting the award if it is deemed advisable. The appropriation bill of the Treasury makes the following provision in connection with distinctive paper:

"Distinctive paper for United States securities: For distinctive paper for United States currency and Federal Reserve bank currency, including transportation of paper, traveling, mill, and other necessary expenses, and salaries of employees and allowance, in lieu of expenses, of officer or officers detailed from the Treasury Department, not exceeding $50 per month each when actually on duty; in all, $851,470: Provided, That in order to foster competition in the manufacture of distinctive paper for United States securities, the Secretary of the Treasury is authorized, in his discretion, to split the award for such paper for the fiscal year 1940 between the two bidders whose prices per pound are the lowest received after advertisement.

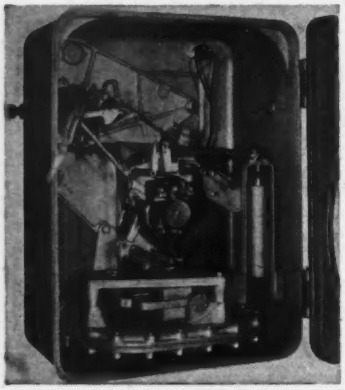
New Bristol Valve Positioner

The Bristol Company, Waterbury, Conn., announces the development of a new valve positioner for use on diaphragm control valves to overcome the effect of friction in the valve stem and top. This pneumatic device is recommended for use on all air-operated control installations where close control is of paramount importance and particularly on those where there is considerable process lag.

This valve positioner assures a proportionate valve stem travel for even the slightest change in the pressure of the air from the controller. Any friction that might tend to prevent the valve disc from coming to its intended position in order to maintain close control is completely overcome.

Air Flow Meter

Bailey Meter Company, Cleveland, Ohio, announces the development of a diaphragm-operated air flow mechanism for its standard Steam Flow-Air Flow Boiler Meter. The use of this mechanism simplifies the application of boiler meters to steam generating units in which high static draft conditions are likely to be encountered. With it, air flow connections may be made at locations in economizers, air heaters, or boilers where high draft conditions preclude the use of the usual oil-sealed air flow mechanism. The mechanism fits neatly into the standard Bailey Boiler Meter as shown in the accompanying illustration. It employs a large diaphragm which is clamped between the flanges of a metal housing. Air flow connections from the boiler are made to this housing on each side of the diaphragm so that changes in differential pressure are measured and recorded in terms of air flow. The diaphragm is made of silk and is coated with a compound which renders it air tight and impervious to both heat and moisture.



Air supplied to the boiler for combustion is recorded by this mechanism and is coordinated on the boiler meter chart with the record of steam flow. When these records coincide one upon the other on the 12-inch diameter uniformly graduated chart, ideal combustion conditions exist and the boiler operator can see that no adjustments to fuel or air supplies need be made.

If the rate of steam flow exceeds the air flow, a deficiency of air is recorded and to restore economical combustion conditions, the operator need only increase the air supply until the pens again coincide.

In addition to recording air flow and steam flow, the standard Bailey Boiler Meter may also record flue gas temperature on the same chart along with the other two records. The record of flue gas temperature is distinguished by recording it in green ink, while the steam flow is recorded in red ink, and the air flow in blue ink. The meter is arranged so that the records may cross one another and so that the records of steam flow and air flow may coincide without interference of the recording pens.

Senator Heads Printing Committee

WASHINGTON, D. C., March 8, 1939 — Senator Carl Hayden of Arizona was elected chairman of the Joint Congressional Committee on Printing at the initial meeting of the Committee last week. Representative Pete Jarman of Alabama is the new vice chairman. The other members of the Committee include Senator David I. Walsh of Massachusetts, Senator Chan Gurney of South Dakota, and Representatives Lawrence J. Connery of Massachusetts and Robert F. Rich of Pennsylvania.

Union Bag Executives Meet

[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., March 6, 1939—The annual meeting of executives of the Union Bag and Paper Company and the heads of the branch sales divisions was held here recently with about seventy-five in attendance. Among those at the meeting were Alexander Calder, president; H. S. Daniels, of New York, vice president in charge of sales; T. M. Avery, Hudson Falls, vice president in charge of factories; J. H. Allen, vice president in charge of the Savannah division; K. R. Karlson, resident agent of the branch at Hudson Falls; Leonard J. Doyle, of New York City, general sales manager, and M. Derrico, specialty sales manager. Among the others attending were the following bag factory managers: P. F. McMahon, Savannah, Ga.; John H. Vail, Chicago, Ill., and Girard S. Brenzel, of Los Angeles, Cal. The meeting was for the purpose of promoting the sale of specialty paper and bag sales and was similar to a session conducted recently at Savannah for the promotion of grocery and odd paper bags. Principal addresses were given by J. D. Griffin, K. R. Karlson, Alexander Calder, T. M. Avery, J. H. Leonard, J. P. Duffy, E. M. Rickell, H. S. Daniels and M. Derrico.

Mohawk Mills Get Brotherhood Charter

[FROM OUR REGULAR CORRESPONDENT]

COHOES, N. Y., March 6, 1939—Employees of the mills of the Mohawk Paper Company in this city and Waterford have been granted a charter in the International Brotherhood of Papermakers, according to announcement here. E. B. Lampton, vice president of the International organization, presented the charter at the ceremony held in the Labor Temple at Troy. Howard Gorham, of Waterford, was chosen president of the organization which will have a membership of several hundred workers. Other officers elected include Louis Colley, vice president; Robert Carey, treasurer; Earl Normandin, financial secretary, and K. R. Moore, recording secretary.

Fourdrinier in Felts Mills Sold

Mansel L. Rankin, paper and pulp mill broker, Sandusky, Ohio, has sold the two 90-inch straight Fourdrinier paper machines and auxiliary equipment in the mill formerly operated by the Sherman Paper Company, Felts Mills, N. Y.

The purchaser is the Acme Paper Box Company and Queen City Paper Company of Toronto, Ont., Canada. The machines will be reconditioned by the Bagley & Sewall Company, Watertown, N. Y.

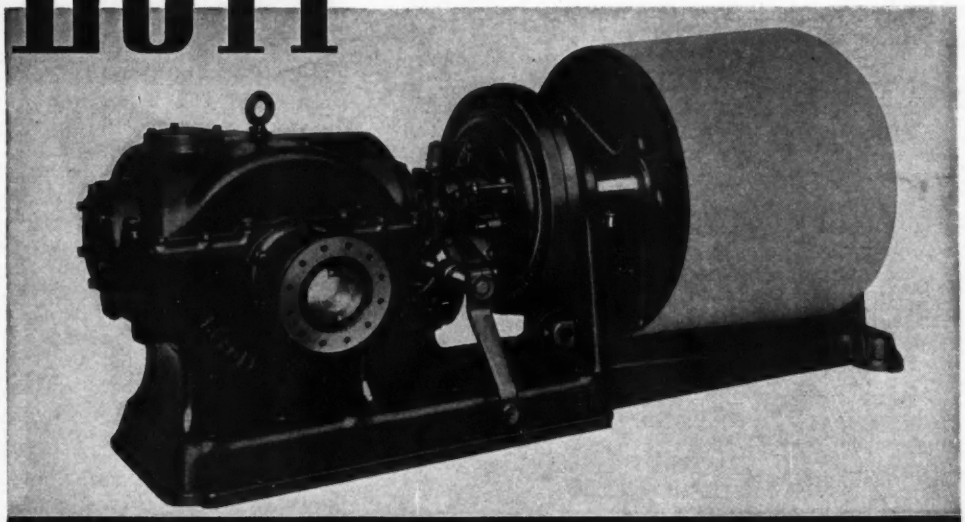
O. H. Moore is preparing the plans for their new mill, which will be located on Carlaw avenue adjacent to their Acme bag and box plant.

New England TAPPI to Hear Sanborn

The New England Section of the Technical Association of the Pulp and Paper Industry will meet at the Roger Smith Hotel, New York, N. Y. on Friday, March 17 at 6:30 P. M.

The speaker will be J. R. Sanborn of the New York State Agricultural Experimental Station, Geneva, N. Y. who will discuss his investigations of the sanitary qualities of papers and boards.

BELOIT



HEAVY DUTY
Hypoid Gear Drive

● **Gears cut of special steel are totally enclosed and operate in bath of oil. Gear and pinion shafts are mounted on roller bearings which are automatically lubricated.**

Equipped with improved Beloit automotive type clutch having unusually large air-cooled friction plate area. Oil lubricated throw out collar.

BELOIT IRON WORKS PAPER MACH'Y BELOIT WIS

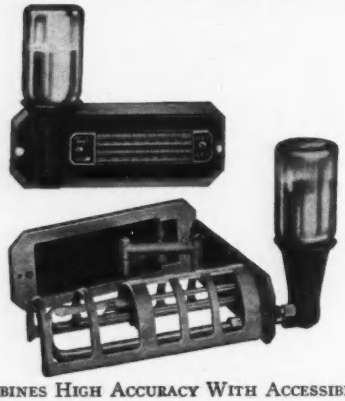
THE BELOIT WAY IS THE MODERN WAY

BELOIT IRON WORKS, Beloit, Wisconsin, U. S. A.

New Taylor Hygrometers

Indicating hygrometers of the wet-and-dry bulb type have always been a source of annoyance to users. Minor servicing, such as wick changing, has required almost complete dismantling of the hygrometer when it was used on air-conditioning supply and return ducts, dryers and other closed compartments.

To overcome this inconvenience, the Taylor Instrument Companies of Rochester, New York, announce a new instrument in the hygrometer field. The Taylor Hygrometer presents for the first time a wet-and-dry bulb instrument that combines high accuracy and legibility with complete accessibility for installation and routine servicing.



COMBINES HIGH ACCURACY WITH ACCESSIBILITY.

To increase the efficiency of the new Taylor Hygrometer, the wet and dry bulbs have been staggered, and can be used in either horizontal or vertical ducts without being on the same plane. This assures proper circulation of air across both bulbs under all conditions. A new type skeleton guard prevents breakage but is designed to have no heat capacity effect to alter the temperature of the air around the bulbs or to hinder the free circulation of air.

The flat tube scales of the new Taylor Hygrometer are mounted horizontally. This presents a more natural position for reading the mercury column.

In operation the unit is simple. Water is supplied the wick by filling the water bottle and inverting it in the bottle holder, which is designed to take the regular "stubby" beer bottle. All parts having contact with the water are treated for corrosion resistance.

Hummel-Ross Order Turbine

The Allis-Chalmers Manufacturing Company has been awarded an order for additional power equipment by the Hummel-Ross Fibre Corporation of Hopewell, Va. The contract, totaling nearly $90,000, covers a 3,000 kilowatt high pressure non-condensing automatic extraction turbo-generator with direct connected exciter and generator air cooler.

This makes the fourth steam turbine furnished by the Milwaukee company for the Hopewell plant of the large kraft paper manufacturer—the earlier units having been rated 500 kw. and 750 kw. and 3,500 kw. respectively. The new unit will furnish additional power to the paper mill and will supply extraction steam for process work. The exhaust of the new unit will go to existing low-pressure steam units.

Indianapolis Looks for Improvement

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., March 6, 1939—While there is no appreciable improvement in the fine paper market here, jobbers are not downhearted and say that February, after all, was not such a bad month. It hardly compared with January, but there was some business done. Competition is very keen and salesmen from the different houses are being kept on their toes. There is only a certain volume of paper business to be had in this territory and paper houses continue to enter the field so there are more than there were. Naturally, as one executive said, all of them are going to get some of the business. It is expected that when the spring season opens there will be quite a bit of direct mail advertising done and the houses should benefit to a certain extent.

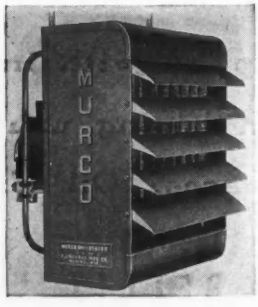
As this is written, fine paper executives are taking an active interest on a bill in the House of Representatives which would reorganize the state printing board so that instead of contracts for all the state printing and office supplies being let every two years, generally to two or three large firms, such contracts will be let in small lots when the supplies are needed. This will permit the entry into competition of smaller printers who, because of lack of facilities are unable to bid on the whole contract and in turn will spread the paper demand over a broader base. Some local executives expect the bill to pass during the remainder of the session.

Prices during the last week have shown no change in fine paper and in fact most other grades. Wrapping paper and bags continue only in fair demand, but some inquiries are being received from the laundry and dry cleaning trade in anticipation of a big spring demand. Thus far no summer specialties are being sold but demand for towels and tissues and cups continues good.

A continued good demand is seen for building paper. This demand has been more or less steady during the entire winter since at no time has the weather been such as to entirely halt construction. Dealers are building up their supplies. An attempt is being made to keep prices down to stimulate more construction.

"Murco" Unit Heater

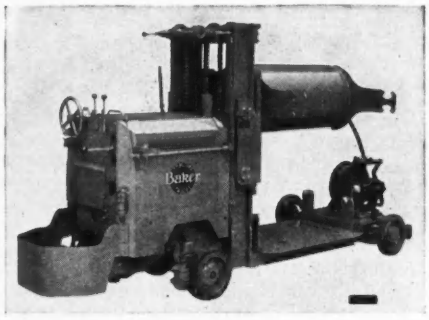
A unit heater developed to meet a demand for a low-priced quality heater is announced by D. J. Murray Manufacturing Company, Wausau, Wis., and known as "Murco" unit heater. As shown in the accompanying illustration it has a streamlined casing, and is made in 25 models with B.t.u. from 20,600 to 556,000, and to deliver 430 to 8600 c.f.m. The heating elements are sturdy copper tubes that are expanded into high-test alloy cast iron headers, so that no strains are set up as would occur if the tubes were welded or brazed to the heater. The condenser is attached to the casing by a special spring support device so that the condenser is "full floating" to overcome contraction and expansion.



Paper Roll Handling Trucks

The Baker-Raulang Company, Cleveland, Ohio, whose trucks are used extensively in the paper industry, has recently built an electric truck specially designed for handling rolls of expensive paper, such as that used in the photographic industry.

The rolls are put on and taken off the storage rack by means of the slotted arms on the roll-over drums, which grab the arbor, lifting and rotating the roll at the same time. Arbor rests have been placed on the platform of the truck to accommodate two rolls, while the third can be carried on the arms. Rotation of the arms is accomplished through an



FOR HANDLING EXPENSIVE PAPER

electric motor inside the cylinder, connections to the battery being made through a special cable reel. The drum can be lifted to a height of 124 inches.

As the paper to be handled is very expensive, many safety and protective features are incorporated in the design of this Baker truck, and special attention has been given to prevent oil or grease from leaking, and to insure the absence of any metallic dust in the air both of which are injurious to the paper. Proper seals insure freedom from both.

The axles are equipped with non-metallic roller guides which provide automatic steering, thus allowing perfect alignment with the roll before the arms are lowered. A slip clutch has been included in the roll drum drive and is set to slip should the rotating arms hook on the rack. Electric interlocks prevent any travel motion while hoist or roll-over are operating and permit travel only when the roll drums are in a vertical position. Heavy mill type contactors of latest construction are used.

Turbines for All Industries

A turbine, in the 100 to 2000 horsepower range, manufactured for every type of industry using mechanical and electrical power, is described in a new booklet released from the Westinghouse Electric and Manufacturing Company.

The design is flexible enough, through selection of proper number of stages, governor and control, to give maximum efficiency and reliability. The turbines give 1000 to 5500 rpm, and are for steam pressures up to 650 pounds, steam temperatures to 750 degrees Fahrenheit, exhaust pressures to 200 pounds, vacuum to 29 inches mercury, and extraction pressures to 200 pounds.

The booklet may be obtained on the Type M turbine from headquarters of the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pennsylvania.

The Chemistry of Cellulose

DIE CHEMIE DER CELLULOSE UNTER BESONDERER BERÜCKSICHTIGUNG DER TEXTIL- UND ZELLSTOFFINDUSTRIEN. Carl G. Schwalbe. 2. völlig umgearbeitete Auflage. 1. Hälfte, 1 Abteilung. Die Chemie der Hölzer. Berlin, Verlag von Gebrüder Borntraeger, 1938. 451 p. 26 curves. 201 tables.

The first edition of Schwalbe's well-known treatise on cellulose appeared in 1911. This represented the most complete monograph on the subject at that time and was received with such enthusiasm that the first printing was sold out in one year. Apparently the author was considering the possibility of preparing a second edition about the time of the outbreak of the World War, for he mentions this and happenings in Germany since that time as factors which interfered with the work; it was only when he was made Professor Emeritus that he was able to complete his task. Because of this long delay, Schwalbe did not live to enjoy the success of his hard work; the first volume was not published until after his death. It is to be hoped that the manuscript for the other volumes is available and that these will appear in due time.

The plan for the work calls for two parts, each in two volumes; the first half of the first part is devoted to the chemistry of wood, and the second half to the chemistry of the grasses, bast fibers, and cellulose hairs. The second part will discuss the preparation, purification, and properties of the pulps prepared from these various raw materials.

In general, the arrangement of the first edition is followed in the second edition. The conifers are represented by spruce (*Picea excelsa*) and pine (*Pinus silvestris*) and the deciduous woods by the red beech (*Fagus silvatica*) and to a lesser extent by poplar or aspen (*Populus tremula*), elm (*Almus glutinosa*), birch (*Betula verrucosa, B. alba*) and others. Under each wood the discussion includes the behavior of the wood toward air, light, heat and chemical reagents (water, acids, bases, salts, and organic compounds); this is followed by exposition of the chemical composition of the wood; under spruce, some 50 pages are devoted to lignin, 11 to the hemicelluloses and 8 to cellulose. There is also a discussion of the bark of these species. Following this, there is a chapter on the comparison of the colloidal-chemical and the chemical characteristics of the individual species. Another chapter is devoted to the formation of wood (plant synthesis) and to the changes which take place by the action of fungi and bacteria. The last chapter is devoted to the analytical methods used for determining the more important characteristics of wood.

Since Schwalbe is a recognized authority in this field, this work furnishes us with a reliable and interesting guide to the very complicated literature which has appeared since 1911. Every one who is working in the chemistry of wood, cellulose, lignin, etc., should certainly read this volume.

C. J. WEST.

Hurry Up Orders for Kraft

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., March 6, 1939—What is regarded as a good sign here in the wrapping paper division of the industry is the fact that customers are asking manufacturer's representatives to "hurry up" deliveries of kraft and paper bags.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Financing and Operation of Pulp and Paper Mills

General Construction News

Cleveland, Ohio—The General Container Corporation, 7275 Wentworth avenue, S. W., operating the Cleveland Corrugated Box Company, same address, manufacturer of corrugated boxes and containers, has concluded negotiations for purchase of former local plant of Riester & Thesmacher Company, 4600 Brookpark road, S. W., previously given over to the manufacture of metal products. The property consists of a tract of over 11 acres of land, improved with a main one-story industrial building, totaling about 75,000 square feet of floor space. It has been held by the Par-Brook Company, successor to Riester & Thesmacher Company; a reported consideration of $62,500 was given for property. In near future, the Cleveland Corrugated Box Company, noted, will occupy the acquired plant, following improvements and installation of equipment, and will carry out large increase in present capacity. At that time present plant will be removed to new location.

High Point, N. C.—The High Point Paper Box Company, Inc., East Russell street, manufacturer of corrugated and other paper boxes and containers, folding cartons, etc., has approved plans for new one-story addition to plant, 53 x 152 feet. General contract for erection has been awarded to R. E. Shelton, Ferndale drive, High Point, and superstructure will be placed under way at once. Cost over $45,000, with equipment. Plant capacity will be increased.

Pearisburg, Va.—The Celanese Corporation of America, Inc., 190 Madison avenue, New York, N. Y., manufacturer of cellulose rayon products, has asked bids on general erection contract for initial buildings for new mill at Pearisburg, fronting on New River, where company has taken over a tract of about 1200 acres of land, as previously noted in these columns. Contract award will be made at early date for two main units, each three-story, 270 x 452 feet, and miscellaneous mechanical structures, including power house and pumping station. Initial mill will represent an investment of about $5,000,000, including buildings and equipment, and is scheduled for completion in 1940. Aaron Schwartz is company engineer.

New York, N. Y.—Weil & Newman, 79 Wooster street, manufacturers of stiff paper boxes and containers, have leased a floor in building at 113-19 Fourth avenue, and will occupy for expansion, including company headquarters.

Trenton, N. J.—Fire recently destroyed a two-story building at plant of Panelyte Corporation, North Enterprise avenue, manufacturer of laminated sheet products and kindred specialties. It was caused by an explosion. An official estimate of loss has not been announced. Plans are under consideration for rebuilding. Company is a subsidiary of the St. Regis Paper Company, 230 Park avenue, New York, N. Y.

Devon, Pa.—The Benjamin C. Betner Company, Devon, manufacturer of paper bags and containers, has arranged for purchase of former local plant of the Quaker Trailer Company, Lancaster Park district, consisting of a tract of over four acres of land, improved with one-story factory buildings. New owner will modernize and improve the property, and will equip for expansion. Present plant will be continued as heretofore.

Niagara, Wis.—The Kimberly-Clark Corporation, Neenah, Wis., manufacturer of book and cover paper stocks, etc., has plans nearing completion and will take bids at early date for superstructure for new addition to power house at branch mill at Niagara, recently referred to in these columns. Structure will be 60 x 90 feet, and about 80 feet high, and will be used as an extension in steam-generating division. Installation will include two two-drum type steam boilers, with rating of 900,000 pounds of steam per hour. The units will be fired with pulverizers of Kennedy-Van Saun Manufacturing & Engineering Corporation type, and each will be provided with a refuse furnace. The new boiler house will allow for the installation of a third new boiler unit at a later date. A 2000-kw. steam turbo-generator will be installed in connection with station expansion. Excavations are under way by the C. R. Meyer & Sons Company, 50 State street, Oshkosh, Wis., which recently received the award for this work. It is proposed to have the plant ready for service during the summer.

Cincinnati, Ohio—The Jackson Box Company, 4927 Beech avenue, Norwood, manufacturer of corrugated paper boxes and containers, has begun work on new one-story addition to plant, 86 x 263 feet, for which general erection contract was awarded recently to the Austin Company, 16112 Euclid avenue, Cleveland, Ohio.

New Companies

Green Bay, Wis.—The Green Bay Paper Company has been organized to deal in paper products of various kinds. The incorporators include H. L. Scholl, L. F. Starr and Dr. John R. Goggins, Green Bay.

Reliance Gets Southland Contract

Reliance Electric and Engineering Company, Cleveland, has secured the contract for approximately half of the electric motors to be installed in the new $6,000,000 newsprint paper mill being erected at Lufkin, Tex., by Southland Mills, Inc., it was announced today by James W. Corey, sales manager of Reliance.

The new mill will be the first to undertake the manufacture of newsprint from Southern pine on a commercial basis. It will have a capacity of 150 tons a day and a group of newspapers has contracted for the entire output of the mill for five years.

"This new mill," Corey said, "is destined to prove a landmark in the development of the South. The solution of the technical difficulties which hitherto have stood in the way of converting Southern pine into newsprint will open up untold possibilities for pulp timber farming and for paper manufacture throughout the entire South. With its enormous reserves of timber available for paper manufacture and the extremely rapid rate of timber growth in the southern climate, the supply of raw material for a rapidly growing southern paper industry should be adequate for expansion for years to come.

The fact is that timber may be destined ultimately to take the place of cotton as a primary southern crop—and paper manufacture will give direction and impetus to industrial progress all the way from Georgia to Texas.

A New Magnus Product

Magnus Chemical Company, Inc., has just issued a new descriptive folder on its new product, Magnus No. 78, which is used for the cold tank cleaning of metal parts by the Magnus process of emulsion degreasing. This method combines the good points of solvent degreasing with soap washing, giving a quality of results better than obtainable with either alone. It quickly and completely removes all mineral oil, dirt, grease, carbon, soot, lacquer, paint and similar coatings. It is non-corrosive to metals and will not injure gaskets and packings.

This folder can be obtained by writing to the Magnus Chemical Company, Inc., Garwood, N. J.

Invite Paper Men To Meeting

The Waste Paper Institute, a division of the National Association of Waste Material Dealers, Inc., is planning for an exceptionally interesting meeting at the Association's Annual Convention to be held in Chicago, March 20 to 22 inclusive.

The Waste Paper Institute Meeting is scheduled for Wednesday forenoon, March 22, and over forty paper manufacturers from the middle west have been invited to attend. This is due to the fact that Dr. Hochstetter who has been carrying on experiments which terminated successfully a few weeks ago when one of the large Pittsburgh daily papers was published on newsprint paper made from de-inked waste paper, will be one of the speakers at the Institute meeting. Dr. Hochstetter will bring up to the minute information on the development in using de-inked paper which development may mean a great deal to the Waste Paper Industry in the future.

Other paper and pulp authorities both from the north and the south are expected to address the members at this meeting.

WISCONSIN EMPLOYMENT OFF

(Continued from page 13)

was the speaker at a meeting at Conway hotel, Appleton, Wis., last week of the Fox and Wisconsin River Industrial Relations Association, made up of personnel directors of paper mills. His subject was "What the Foreman and Superintendents Think of Present-Day Industrial Relations Programs." He pointed out the need for more unified management; that is, a more intimate relation between the top and intermediate management units. He also urged better training programs for foremen and other employees. The program was arranged by Bernard McClockey, of the Hoberg Paper Mills, Inc., Green Bay, Wis.

Dr. Lewis to Address Engineers Club

A meeting of the Engineers Club of the Kimberly-Clark Corporation, Neenah, Wis., is scheduled for March 8, with a dinner at Hotel Appleton at Appleton, Wis. The speaker is to be Dr. Harry F. Lewis, dean of the Institute of Paper Chemistry, Appleton. G. H. Spaulding, Neenah, Wis., is president of the group.

Paper Men Reelected to Chamber of Commerce

Several paper mill executives were reelected directors of the Wisconsin State Chamber of Commerce at its annual meeting at Milwaukee, Wis. last week. They are: L. G. Wood, vice-president of the Paper Converting Company, Green Bay, Wis.; A. M. Van Douser, president of the Paper Specialty Company, Milwaukee, Wis.; also D. W. Billings, district manager of the Wisconsin Power and Light Company, Ripon, Wis. Henry J. Allen, former governor and U. S. senator from Kansas, was the principal speaker.

Thilmany Sells Idle Mill

The Thilmany Pulp and Paper Company of Kaukauna, Wis., has sold its abandoned tissue mill here to the Western Condensing Company, according to announcement of Myron T. Ray, secretary and treasurer. A branch plant will be established there for the production of dried whey. Operation of the mill was discontinued several years ago when the company decided to concentrate all of its operations at Kaukauna. The machinery was moved at that time to additions made to the main mill.

Leeds & Northrup Issue Catalogue

A new 20-page, illustrated catalog on "Micromax Condensate Purity Instruments for the Steam Plant" is offered to executives, engineers and operating men concerned with steam generation—whether for power or process use. It shows how a knowledge of condensate conditions helps to effect important operating economies. It describes a reliable electrical method for continuously determining variations in condensate purity. It also describes Micromax recorders which automatically draw a chart record of condensate conditions, and, if contamination occurs, actuate an alarm to warn operator, or in addition, operate a motorized valve to divert impure condensate to waste. Illustrations include typical applications. To receive a copy, ask Leeds & Northrup Company, 4934 Stenton Avenue, Philadelphia, for Catalog N-95-163.

PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

Henry J. Berger
EDITOR

Ronald G. Macdonald
Editor Technical Section

Lynne M. Lamm
Washington Correspondent

Vol. CVIII New York, March 9, 1939 No. 10

COMING EVENTS IN PAPER INDUSTRY

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Fall Meeting, Syracuse Hotel, Syracuse, N. Y., September 12-14.

NEW ENGLAND SECTION, Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

AMERICAN PULP AND PAPER MILL SUPERINTENDENTS ASSOCIATION, Annual Convention, Wardman Park Hotel, Washington, D. C. June 13-15.

FIRST ANNUAL SOUTHERN PAPER FESTIVAL, Savannah, Ga. April 16-19.

NATIONAL SAFETY COUNCIL, PAPER AND PULP SECTION, Annual Meeting, Atlantic City, N. J. October 16-20.

RECOVERY POLICY

The assurance of President Roosevelt that no new tax legislation will be imposed upon business in the near future, is encouraging. The invitation of Secretary Morgenthau inviting Congress "to take a careful look at the tax laws to see if there are any deterrents holding the business man from making future commitments", is also encouraging. The address of Harry L. Hopkins, Secretary of Commerce, before the Des Moines Economic Club, on February 24, kindles hope that the Administration may cease making further adventures in the fields of political and business economics and return to the practical and essential functions of government.

In the statement by Mr. Hopkins, "With the emphasis shifted from reform to recovery, this Administration is now determined to promote that recovery with all the vigor and power at its command", hope is raised that the Administration has at last awakened to the fact that real recovery is yet as far off as at any period in our history and that an unsound fiscal policy has been the principal cause for such faltering recovery as has been achieved to date. These assurances are necessarily generalities, but the hearty response to study taxes to lift business curbs, made by Representative Doughton of North Carolina, chairman of the Ways and Means Committee, in which all revenue legislation must originate, may lead to some changes in present burdensome tax laws and relieve business of some of the severe restriction which now prevents increased production and employment.

But, the effect of the Administration's assurances will depend upon what specific demonstrations are made. In praising Mr. Hopkins' address as excellent and sound, William Randolph Hearst, in a nation-wide radio broadcast from Station KECA, Los Angeles, Cal., on March 4, said in part: "The New Deal has never been friendly to business; in fact, it has been fundamentally unfavorable to industry and to business generally." Mr. Hearst said that the Administration never had shown any comprehensive knowledge of how to bring about recovery, and asserted that "economic and governmental conditions did not permit business and industry to enlarge production and increase employment, no matter how much goodwill there was. To attain prosperity, Mr. Hearst said, the following essentials were needed: "To have an Administration which will sit on the industrial side of the table, which will look on situations from the viewpoint of American industry, which will reduce burdens on industry and increase the opportunities for industry, and consequently for production and consequently for employment. To give American industry its home market, in order to enable it to produce fully and pay liberally and maintain the American standard of living."

It is not clear how under present conditions the Administration can make other than a very limited reduction in taxes. Today the total revenue of the Federal Government is about $5,500,000,000, while expenditures are around $9,500,000,000. It is because of this wide gap between input and output that so many business men are sceptical of much progress toward recovery while the present unsound fiscal policy of the Administration is in effect. And the answer to the question of how Government can help business expand, has been suggested many times. One effective means to free business and increase production, would be a change in the present corporation tax, to enable a corporation to deduct losses of one year from the profits of the next two years, as was permitted under the Revenue Act of 1932. Another good change would be a reduction of the burden of the capital gains tax.

In reviewing possible revision in taxes, Godrey N. Nelson, lawyer, tax expert and secretary of The New York Times Company, said in part: "Industry, honestly conducted, should have the fullest cooperation of the government for its expansion and continued development. Industrial growth and national growth may be regarded as economically synonymous! the first is essential to the other. A growing business, not a monopoly, should be permitted to plow back its earnings without limitation so long as it does not improperly accumulate surplus. As in England, the tax upon corporations could be a flat rate, deductible by the corporation from dividend

distributions. Thus, a corporation distributing all of its earnings would recoup the entire amount of income-tax paid. A corporate shareholder whose combined normal and surtax was less than the amount paid for him by the corporation and deducted from his dividend, would be entitled to refund of the withheld overage.

"The tax on capital gains might well be either wholly eliminated or further reduced as to rate and simplified as to calculation. If the tax is retained in principle, the present limitation on capital losses sustained by corporations should be modified. The carry-over privilege in respect to business net losses should be reestablished so as to permit of their deduction over not less than a three-year period. Corporations should be allowed the privilege of filing consolidated returns in cases of wholly owned, or 95 per cent owned, subsidiaries. And the double taxation of 15 per cent of dividends received by corporations should be repealed."

American Writing Paper Cases Settled

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, March 6, 1939—An unamplified statement issued by the Holyoke Water Power Company this week, signalized the close of certain litigation which that company had with the American Writing Paper Corp. The statement was as follows:

"Certain legal differences which have existed between the American Writing Paper Corporation and the Holyoke Water Power Company have been adjusted by the execution of several legal documents.

"These differences arose over divergent interpretations of the old water power contracts which were executed many years ago, and necessitated several court decisions in recent years.

"The documents which were executed today (March 2) by President Leon M. Yoerg of the paper company and President Robert E. Barrett of the power company reconcile the differences between the corporations."

The paper company, backed by a Supreme Court ruling, had been paying the power company in silver for a number of years. There had also been court actions in regard to the use of processed water.

Adirondack Pulp Co. Expands

[FROM OUR REGULAR CORRESPONDENT]

CARTHAGE, N. Y., March 4, 1939—Announcement is made that the output of the Adirondack Core and Plug Company has been more than doubled since the new mill was placed in operation to replace the structure destroyed by fire last summer. The new structure cost in the neighborhood of $25,000 and has been in operation for several weeks. The new mill is 160 feet long, 80 feet wide, 30 feet high and has a gable roof. The north end of the second story has been fitted for a paper roll plug turning department. Modern sawing equipment has been installed throughout. The plant is powered by electricity with the exception of a small boiler. The new mill is erected on the site of the old plant and indications are that capacity schedules will be in effect for some time.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES[1]

Months	1939	1938	1937	1936	1935	1934
January	77.1%	63.9%	90.3%	76.1%	65.8%	.....
February	80.9%	68.7%	90.1%	77.9%	70.0%	.....
March	.....	69.6%	90.3%	76.0%	70.5%	.....
April	.....	68.3%	92.1%	82.3%	70.0%	.....
May	.....	69.0%	90.6%	81.6%	69.4%	.....
June	.....	66.0%	87.3%	80.7%	72.3%	.....
July	.....	72.0%	81.8%	77.3%	64.9%	.....
August	.....	77.2%	82.9%	81.5%	70.9%	.....
September	.....	76.3%	78.6%	80.5%	71.9%	58.2%
October	.....	82.5%	73.5%	87.6%	75.6%	64.7%
November	.....	79.6%	61.9%	88.0%	75.3%	61.7%
December	.....	74.4%	54.5%	85.9%	71.2%	59.6%
Year Average	.....	72.3%	80.6%	81.3%	70.5%	.....
First 8 weeks	78.9%	66.3%	90.2%	76.9%	67.3%	.....

COMPARATIVE WEEKLY SUMMARIES[1]

CURRENT WEEKS, 1939		CORRESPONDING WEEKS, 1938	
January 21	77.8%	January 22	66.0%
January 28	80.9%	January 29	68.1%
February 4	80.8%	February 5	67.1%
February 11	82.3%	February 12	68.0%
February 18	82.4%	February 19	68.4%
February 25	76.9%	February 26	71.3%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting—Curent Weeks					
Ratio Limits	Jan. 21, 1939	Jan. 28, 1939	Feb. 4, 1939	Feb. 11, 1939	Feb. 18, 1939	Feb. 25, 1939
0% to 50%	65	69	58	50	42	45
51% to 100%	244	237	246	250	251	162
Total Mills Reporting	309	306	304	300	293	207

PAPERBOARD OPERATING RATIOS

(Per cent of operation based on "Inch-Hours" reported to the National Paperboard Association.)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1935	62%	68%	68%	63%	61%	66%	62%
1936	62%	67%	67%	70%	69%	70%	69%
1937	80%	86%	86%	88%	85%	77%	66%
1938	54%	60%	61%	57%	58%	56%	57%
1939	60%	....	....	....	....	....	....

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1935	67%	71%	77%	71%	61%	66%
1936	75%	78%	82%	80%	74%	72%
1937	74%	69%	65%	55%	45%	73%
1938	66%	66%	70%	65%	59%	61%
1939	....	....	....	....	....	....

Week end. Jan. 21, 1939—65%
Week end. Jan. 28, 1939—68%
Week end. Feb. 4, 1939—66%
Week end. Feb. 11, 1939—69%
Week end. Feb. 18, 1939—67%
Week end. Feb. 25, 1939—68%

[1] Production-capacity ratios are based upon six-day capacity ratings which are adusted periodically to correspond with the ratings reported by individual companies. Ratios are subject to revision until all reports are received.

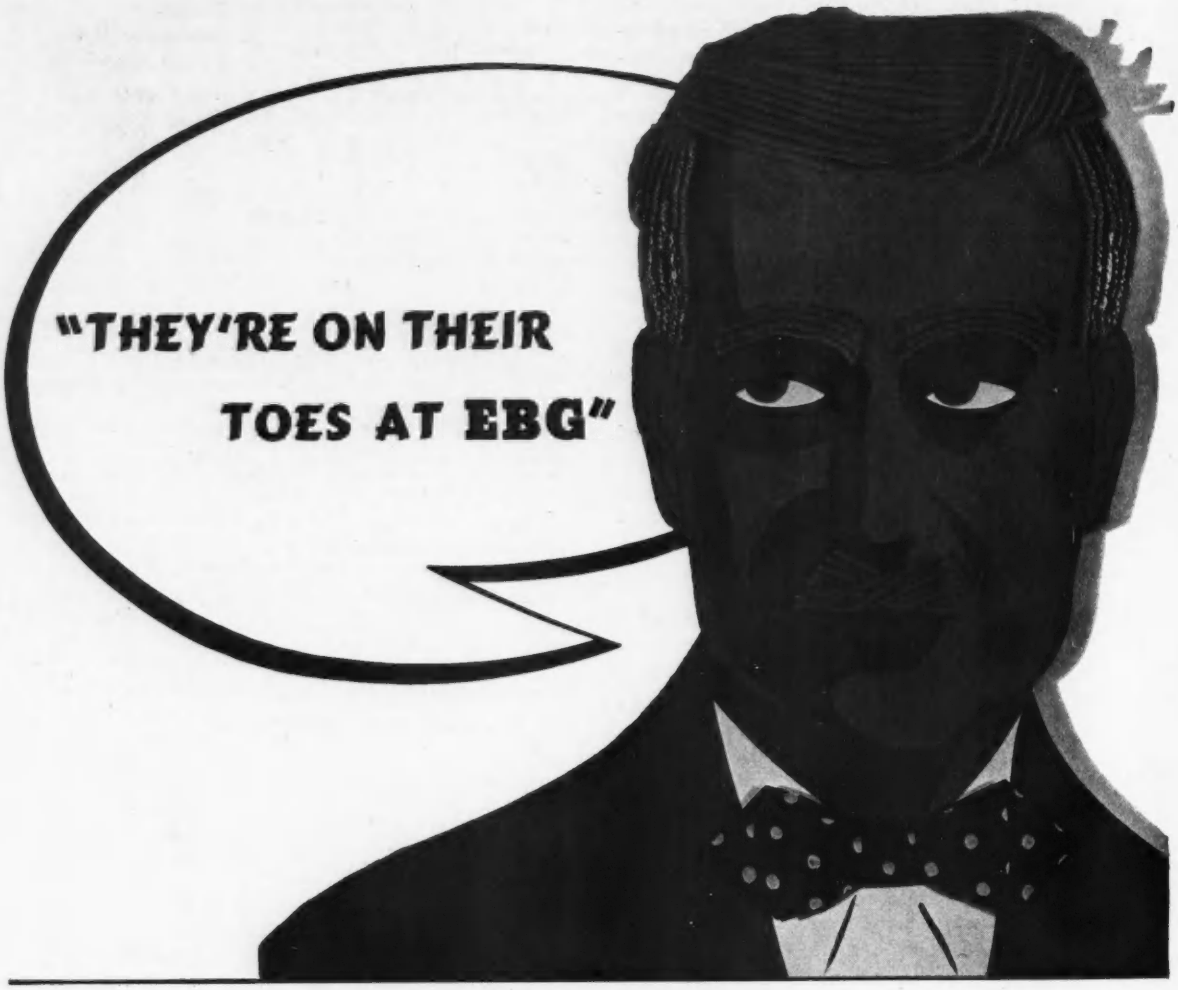
Now Cherry River Paper Co.

The Cherry River Paper Company, a new Delaware corporation, which is closely affiliated with the North Carolina Pulp Company, has acquired the plant and business formerly known as the Cherry River Paper Company of West Virginia. The mill properties acquired are located at Richwood, W. Va.

Through research, special pulps have been developed which will eventually be made by the North Carolina Pulp Company for the Cherry River Paper Company requirements.

The carefully trained Cherry River personnel will continue to manufacture and merchandise its well established full line of boards and papers for conversion purposes.

No changes will be made in the management and policies of the Cherry River Paper Company. George M. Snyder will continue as general superintendent; J. M. S. Ewing as manager of sales; and Clarke H. Morian as president.



● Being the first to produce liquid chlorine in the U. S. A. was only a first "first" for EBG. Other firsts include the introduction of liquid chlorine to the sterilization of water and the treatment of sewage ...paper bleaching...textile bleaching...and the bleaching of shellac. As other applications are constantly being discovered for this important product, and the field of its usefulness widens, EBG continues its pioneering activity. That's why customers say, "They're on their toes at EBG!"

ELECTRO BLEACHING GAS COMPANY

MAIN OFFICE: 60 EAST 42nd STREET, NEW YORK, N. Y. • PLANT: NIAGARA FALLS, N. Y.

EBG Liquid Chlorine
FIRST IN THE COUNTRY

Section of the Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

Review Of Paper Industry Literature

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C. for 10 cents each. Send currency, not stamps.

Cellulose and Lignin

Purification of Wood Cellulose. Fred Olsen. Ind. Eng. Chem. 30:524-526 (May, 1938).—Wood cellulose has been prepared from conifers such as spruce, western hemlock, etc., and from deciduous woods such as maple, birch, aspen, cotton wood, etc., which compares favorably with cotton. An alpha-cellulose content of 99 per cent, pentosans less than 1.5 per cent and loss in 7.14 per cent sodium hydroxide solution of less than 2 per cent have been obtained. At the same time the viscosity can be held, if desired, at levels even higher than that of purified cotton fibers. The reactivity of the purified cellulose is very high.—A.P.-C.

Methods of Cellulose Determination. J. Hanssens. Rusta-Rayonne 13:3-9 (1938).—A description of the Cross and Bevan, of the Norman and Jenkins, of the Schmidt, and of the Kürschner and Hoffer methods, with a brief discussion of their relative merits.—A.P.-C.

The Rossi-Cholodny Technic As An Aid in the Study of the Decomposition of Lignin. H. H. Mollenhoff, F. B. Smith and P. E. Brown. Proc. Iowa Acad. Sci. 43:117-121 (1936).—The Rossi-Cholodny technic was employed in a study of the decomposition of different organic substances and the results, which are tabulated, indicate that the method may serve as an index to the changes which normally occur on the decomposition of organic matter.—A.P.-C.

Lignocellulose. P. N. Sen-Gupta and H. K. Sen. Science and Culture 3:442 (1938).—Lignin was isolated from gongwa (*Excoecaria agallocha*), dried water hyacinth and rice straw by extraction with 72 per cent sulphuric acid. Acetic acid was determined from the filtrates. Pure cellulose was obtained from the same sources by the chlorine dioxide method. The lignins were exhaustively methylated with dimethyl sulphate, acetylated with acetic anhydride, chlorinated with chlorine gas and nitrated with five times normal nitric acid. The lignins gave no test for pentoses. The following analytical results (on the dry basis) were obtained, arranged in the order, gongwa, rice straw, water hyacinth: lignin—34.2, 24.2, 15.7; acetic acid—4.9, 9.9, 10.3; cellulose—56.0, 44.6, 42.0. Percentages on the basis of acid-free lignin: ash—4.92, 2.6, 4.6; methoxy before methylation —14.2, 4.15, 2.6; methoxy after methylation—26.2, 11.9, 11.2; acetyl before acetylation—1.3, 2.2, 2.6; acetyl after acetylation 25.2, 35.6, 31.9; chlorine after chlorination—17.3, 16.4, 29.2; nitrogen of the solid (insoluble) residue—6.7, 3.9, 14.1; carbon—53.8, 42.11, 29.0; hydrogen—5.13, 3.25, 4.18.—A.P.-C.

Lignin and Related Compounds. XXX. The cleavage of formaldehyde from lignin by acids. M. J. Hunter, G. F. Wright and H. Hibbert, Ber. 71, No. 4:734-745 (April 6, 1938); B. I. P. C. 8:382.—Hexoses, containing the groupings—C(OH) (CH_2-OH).O—, —CH(CH_2OH).O—, or —CH(OH).CH (OH).O—, when boiled with 12 per cent hydrochloric acid or 28 per cent sulfuric acid, give formaldehyde and furfural in amounts which are dependent upon the experimental conditions. Piperonal, safrol, and piperonylic acid under the same conditions yield formaldehyde almost quantitatively. Lignin preparations obtained in different ways give formaldehyde and furfural in varying amounts. The nucleus containing the methylenedioxy group is only slightly or not at all changed under the conditions used in the isolation of lignin. The presence of a methylenedioxy group in lignin is disputed.—C. J. W.

Lignin and Related Compounds. XXXI. The aromatic and non-aromatic constituents. Alan Bell, A. B. Cramer, G. F. Wright and H. Hibbert. Ber. 71, No. 4:746-755 (April 6, 1938); B. I. P. C. 8:382.—Experiments with lignin extracted by means of formic acid of different concentrations and with humic acids obtained by the action of formic acid on various carbohydrates followed by methylation with dimethyl sulphate and oxidation according to Freudenberg led to the conclusion that lignin is neither entirely aromatic nor entirely non-aromatic, but is composed of aromatic and carbohydrate components.—C. J. W.

Alkaline Process

Alkali Losses in Sulphate Mills. H. Liander. Svensk Papperstidn. 41, No. 8:267-271 (April 30, 1938); B. I. P. C. 8:367. The alkali losses in the waste gas from sulphate mills depend to a large extent upon the recovery furnace and the method by which the operations are carried out; this has been confirmed by the results of various investigations. The author discusses the chemical reactions taking place during evaporation and combustion of the black liquor, and the efficiency of alkali recovery by either washing the stack gases or by electrical filtration. Reference to equipment working according to either

principle is made, the electric filters thus far giving the better results (efficiency 90-97 per cent).—C. J. W.

Developments and Improvement in the Continuous Production of Chemical Pulp. Guilio Consiglio. Paper 41:29-35, 117-127 (Jan., Feb., 1938).—A brief outline of the pulp industry throughout the world, and of recent developments and improvements made in the Pomilio chlorine gas pulping process.—A.P.-C.

Digester Blowdown Condensing Systems. Pell W. Foster, Jr. Pulp Paper Mag. Can. 39:334-337 (April, 1938).—A description of surface type and jet type condensers suitable for recovering heat from the flash steam produced on blowing down sulphate digesters, a condenser for recovering turpentine from sulphate digester relief, and three arrangements for generating low-pressure (25 lbs.) steam from sulphate digester blowdown by the use of a Ruths steam accumulator.—A.P.-C.

Chlorine in Pulp Production—the Development of the Pomilio Process. Umberto Pomilio. Chem. Trade J. 102:193-195, 214-215 (1938).—Elementary gaseous moist chlorine is employed for the delignification of mildly predigested fibrous raw materials for cellulose isolation. Four chemical operations are involved: (1) alkaline pretreatment, (2) gas chlorination, (3) alkaline wash, (4) active chlorine bleach. Elementary gaseous chlorine chlorinates, while active chlorine oxidizes. Features of the process are continuity throughout, standardization of machinery and equipment, towers for digestion and chlorination working on the countercurrent principle and equipped with variable-speed extractors, capable of adjusting the chemical process to the most suitable conditions required for the particular raw material, and the final product aimed at. Chlorination takes place under a complete absence of mechanical equipment which renders the elimination of corrosion an easy task. Extraction of 95 per cent of the cellulose theoretically contained in the raw materials such as grasses, straws and woods, is obtained. Plants in operation and under construction are listed and probable future developments of the processes are indicated.—A.P.-C.

Chlorine As a Deodorant in Sulphate Paper Pulp Manufacture. W. O. Gordon and E. E. Creitz. Paper Trade J. 106, No. 17:81-85 (April 28, 1938).—Chlorine is effective in neutralizing the odor from sulphate pulp mills. Approximately 25 lbs. of chlorine per ton of pulp produced is necessary to effect odor elimination. Preliminary results indicate that alum and ferrous sulphate have a clarifying action on mill effluent darkened by black liquor. Since chlorine is so reactive with solutions containing black liquor, it may be found that through a floc the amount of chlorine absorbed by the mill effluent will be decreased.—A.P.-C.

The Use of Chlorine Gas in Industrial Pulp Manufacture. Umberto Pomilio. World's Paper Trade Rev. 109, Techn. Conv. No. :4-52 (March, 1938).—A detailed description and discussion dealing with the history, principle, features, chemistry, technology and economics of the Pomilio chlorine gas pulping process, together with a detailed description of the machinery of the South African mill.—A.P.-C.

Paper Versus Chemicals. M. B. Mount. Paper Mill 60, No. 47:17, 19, 22 (Nov. 20, 1937).—A brief general discussion of the possible reasons for variations in the consumption of various chemicals in the production of soda and sulphate pulps in different mills.—A.P.-C.

Dorr Continuous Recausticizing at Fernandina. Donald L. Hague. Paper Mill 61, No. 5:27-30 (Jan. 29, 1938).—A description of the system installed at the mill of the Kraft Corp., at Fernandina, Fla.—A.P.-C.

New Development in Soda Pulp Process. C. D. DeMers. Paper Mill 61, No. 16:15-20 (April 16, 1938).—A discussion of the importance of the application of technical control in soda pulp manufacture, together with a description of the application of the Taylor time schedule pressure and temperature controller on a soda pulp digester and a discussion of its merits.—A.P.-C.

Sulphite Process

Solubility of Sulphur Dioxide in Calcium Bisulphite. K. V. Khodakov. Pumazhnaya Prom. 15, No. 9:33-38 (1937); C. A. 32:4331.—The saturation of equivalent quantities of calcium oxide, magnesium oxide and dolomite with sulphur dioxide under equal conditions gives cooking acids of equal strength. Data are given on the increasing strength of the acid liquor with increasing concentration of bases and on the drect proportion between the partial pressure and bisulphite concentration. A solubility nomogram for sulphur dioxide under various conditions is given and its use in the control of the preparation of acid, pulping and recovery of spent liquor is described. A procedure is discussed for storing cooking liquor under a layer of cymene to prevent precipitation.—C. J. W.

A Simple Method of Separation of Sulphur Dioxide and Sulphur Trioxide in Gases from Roating and Flue Gases Containing Nitrogen Trioxide from Sulphuric Acid Plants. H. Lohfert. Angew. Chem. 51, No. 16:228-31 (April 23, 1938); B. I. P. C. 8:406.—The Kraus method (Angew. Chem. 48:227-8 [1935]) for separation of sulphur dioxide and sulphur trioxide in gases from roasting gives values which are too high. A filter method has been developed, in which the gases are led increasingly through Jena 7G1, 7G2, 7G3, and 7G4 glass filters to remove sulphur trioxide and sulphuric acid. The sulphur dioxide passing through is absorbed in two wash bottles containing *N* sodium hydroxide. Oxidation during the separation has been reduced to a minimum. The method may be applied to gases from roasting and flue gases containing nitrogen trioxide from sulphuric acid plants. In the former case 10 liters of gas are passed through the apparatus at a rate of five liters per hour, in the latter 100 liters of gas at a rate of 10 to 20 liters per hour.—C. J. W.

Recent Investigations of the Sulphite Cooking Process. Erik Haegglund. Svensk Papperstidn. 41, No. 6:194, 202 (March 31, 1938); B. I. P. C. 8:405.—The author discusses the different rates of penetration of the cooking acid into wood chips parallel, radial or tangential to the fiber direction, under ordinary conditions and with previous wet or dry evacuation, the influence of chip size, and variations caused by chips of identical size, but cut in the tangential direction or at right angles to the annual rings. The tangential chips contain about 6 times as many medullary rays and cook much quicker than the radial chips. Chips of increasing length, the width remaining constant, give a higher yield and

Roe number, whereas chips of increasing width, the length remaining constant, show decreasing values. No relationship could be established between size of chips and strength properties of the resulting pulps. Wood treated with warm water to facilitate barking (R.N.A. system) gives pulps of identical strength properties as non-treated wood when allowed to cool before chipping; otherwise a 10 per cent decrease of pulp strength becomes evident. This phenomenon is probably based on a weakening of the primary lamellas by the hot water. The results are tabulated and illustrated by graphs.—C. J. W.

Concerning the Rate of Cooking of Sapwood and Heartwood. Christian Kaijser. Svensk Papperstidn. 41, No. 8:265-6 (April 30, 1938); B. I. P. C. 8:406.—Supplementing some of the statements in Hägglund's article with regard to rate of penetration of the cooking acid into the chips, the author postulates that this phenomenon is in close relationship to the anatomical structure of wood; the rate of penetration depends, therefore, upon the number of parenchyme cells present, the number of thin-walled spring wood cells present in both sapwood and heartwood and, finally, upon the extent and thickness of heartwood formation. Reference is made to the similarity of the behavior of cooking liquor with sinkage studies of floated wood.—C. J. W.

Analysis of Bisulphite Cooking Liquors. Kenneth A. Kobe and Bernard A. Burke. Pacific Pulp & Paper Industry 12. No. 3:20-21 (March, 1938); Pulp Paper Mag. Can. 39:344-345 (April, 1938).—Bisulphite liquors can be analyzed by means of a calcium hypochlorite solution, which reagent is inexpensive and stable. In the case of ammonium bisulphite liquor, both sulphur dioxide and ammonia can be determined by the use of calcium hypochlorite. —A.P.-C.

Utilization and Disposal of Sulphite Waste Liquor. K. A. Kobe. Sewage Works J. 9: 1019-1023 (1937).—Sulphite waste liquor has the greatest pollution effect of any paper mill waste as more than one half of the wood weight is discharged as waste liquor. Pollution may be prevented by utilization of the products; the possible field of utilization (for yeast production, ethanol by fermentation, adhesives for linoleum cement, road binder, tanning extract, synthetic plastics, etc.) is reviewed. By evaporation or precipitation, a fuel can be obtained. —A.P.-C.

Digesting Fibrous Material. Albert D. Merrill, assignor to Chemipulp Process, Inc. Can. pat. 372,005 (Feb. 22, 1938).—A digester is charged with fibrous material and filled with acid liquor. The liquor is withdrawn at temperature below 120°C. and passed to a storage container. The temperature of the digester liquor is raised above 120°C. by heating inside the digester without direct contact with the heating medium, and liquor is withdrawn from the upper part of the digester and returned to the lower part.—A.P.-C.

Digestion of Fibrous Material. Thomas L. Dunbar and Albert D. Merrill, assignors to Chemipulp Process, Inc. Can. pat. 372,007 (Feb. 22, 1938).—In digesting fibrous material by the sulphite process, the acid is heated to above 100°C. during its passage from the acid-making system to the digester without substantial loss of free sulphur dioxide by increasing the temperature of the acid in proportion to the pressure to which it is progressively subjected during the course of such passage to the digester.—A.P.-C.

Experience with Pulp from Deciduous Wood. Johannes Teicher. Papier-Fabr. 35, No. 47:443-45 (Nov. 19, 1937).—Twenty-five per cent of the forest area in Germany is beech, which is similar to eucalyptus in ash, alcohol extract and raw cellulose. The author then describes in detail all operating conditions for the production of sulphite pulp by the Ritter Kellner process from eucalyptus wood in Brazil. By using 25 per cent of this pulp with the usual long fibered pulp, a superior paper is produced which has desirable printing qualities.—J. F. O.

Miscellaneous Digesting Methods

Production of Cellulose. Henry Dreyfus. Brit. pat. 474,305 (Oct. 29, 1937).—Cellulose for the manufacture of paper, cellulose solutions or cellulose derivatives is obtained by removing lignin from lignocellulosic material, e.g., wood, straw, grass, by treatment with a mixture of a lower aliphatic acid, e.g., formic or acetic acid, and nitric acid and then treating with alkali. After the acid treatment, the material may be pressed, centrifuged and washed. The treatment with acid may be preceded by an alkali treatment, e.g., with 1 to 5 per cent caustic alkali at 100°C., continued until a substantial proportion of the lignin has been removed. In any case, the materials may first be treated with dilute alkali or with water at atmospheric or higher pressure to remove gums, resins, etc. Part of the lignin may also be removed by an acid treatment, e.g., with sulphite liquor, before the acid treatment of the invention. In an example, sawdust is heated to 95°C. at atmospheric pressure with 20 times its weight of 25 per cent aqueous acetic acid containing 1 per cent of nitric acid for 3 hrs., the acid is removed by filtration, the solids are washed, boiled with a 3.4 per cent sodium hydroxide and (or) treated in the cold with 12 per cent sodium hydroxide.—A.P.-C.

Decomposing Cellulose Materials. Johann Bohunek, Heimo Hoch and Georg Mayrhofer. Brit. pat. 476,191 (Dec. 3, 1937).—Materials such as wood, preferably practically free from water, are decomposed by hydrofluoric acid at a low temperature, by first extracting as far as possible by a high vacuum the air from the reaction chamber and in the cells of the material, and then allowing the hydrofluoric acid to penetrate the vessel in the absence of diluting gases or vapors. The hydrofluoric acid may be used in small amount and followed by treatment with dilute mineral acids at a higher temperature.—A.P.-C.

Nitric Acid Pulp from Beach Wood. Gustav Feldtmann. Zellstoff u. Papier 18, No. 2:55-56 (Feb., 1938).—Brief history of the decomposition of wood by means of nitric acid from its inception in 1846, to the present day. The process was successfully used in the Thode'schen paper mill in 1925 but was not continued because of the high consumption of nitric acid. In 1936, I. G. Farbenindustrie A.G. built a mill of 40 tons capacity for the production of pulp from beech wood by the nitric acid process and this pulp after further refining is said to be suitable for the production of artificial silk.—J. F. O.

Production of Cellulose. "Snia-Viscosa" Societa Nazionale Industria Applicazioni Viscosa. Brit. pat. 474,188 (Oct. 27, 1937).—The process is intended for the treatment of vegetable material having a high silica content, e.g., corn stalks, the first stage removing incrusting substances and silica and the second removing hemicellulose.—A.P.-C.

Adhesives

Evaluation of Adhesives. Papier-Ztg. 63, no. 31/32:676 (April 16, 1938); B. I. P. C. 8:366.—No standard testing methods for evaluating adhesives in general have yet been developed. A few simple tests are described for determining the water content, addition of borax for increasing the viscosity, durability on storing at higher and lower temperatures, and whether pastes are neutral or have alkaline or acid additions. For most purposes neutral adhesives are the most desirable. Another important property is bonding strength; strips of equal width are cut from a sheet and pasted together with the adhesive under investigation. After complete drying, eventually under pressure, the two sample strips are torn apart. When the two paper surfaces remain intact after separation, it indicates insufficient bonding strength, otherwise fibers are torn loose from either paper surface. Other tests compare the difference between sizd and unsized papers in either a tearing or Mullen tester.—C. J. W.

Self-Gumming. W. Holtegel. Papier-Ztg. 63, No. 30:647-649 (April 13, 1938); B. I. P. C. 8:366.—The basis of all self-gumming substances is rubber latex to which rosin is usually added in small quantities, and sometimes a filler, such as zinc white; benzine, benzene, carbor tetrachloride, etc, are used as dissolving and mixing agents. The bonding strength of these materials is considerable if correctly applied and certain precautions are taken. At high temperatures the softness of the adhesive layer increases and the bonding efficiency decreases. The layer is exceedingly sensitive to dust and should be well protected from it. It has a strong tendency to "creep" which increases under pressure and is specially pronounced in rosin-rubber mixtures which contain fats and oils. This tendency may be so strong that the rosin and fats separate from the rubber and penetrate the paper structure, causing after a certain period a non-removable transparent spot, a very undesirable occurrence in etchings or drawings mended with transparent tape of the self-gumming kind. All these deficiencies are considerably reduced when a filler is added to the adhesive layer.—C. J. W.

Bleaching

Sulphite Cellulose Bleaching: Use of Chemically Purified Water. Harald Fogelberg. World's Paper Trade Rev. 108:TS83 (Sept. 17, 1937).—As the water in the lower part of the River Kumo carries considerable slime during the rainy period and when the ice is breaking up, chemical purification is necessary, especially of the water used for bleaching and washing the pulp. When the river is frozen and during part of the summer the use of chemically purified water can be limited to the final washing before the pulp goes to the drying machine. The use of back water from the thickeners as diluting water for washing bleached pulp has a bad effect on the whiteness, and it would seem as though the combination of chemically purified water and backwater is more harmful in this respect than the combination of mechanically purified water and back water.—A.P.-C.

Bleaching Cellulose. Electrochlore. Fr. pat. 821,563 (Dec. 8, 1937).—Ligno- or lignopectocellulose is bleached by hypochlorous acid produced by the action of carbon dioxide on calcium hypochlorite or by the action of chlorine on calcium carbonote suspended in water.—A.P.-C.

The History of Bleaching Paper Pulp in England. James Strachan. Paper-Maker 95: TS1-2 (Jan., 1938).—Brief historical notes.—A.P.-C.

Evolution of the Bleaching of Celluose Fibers. E. Justin-Mueller. Teintex 2:750-754 (1937)—A historical review.—A.P.-C.

Atlantic Refining Co. Joins TAPPI

The Atlantic Refining Company has become a member of the Technical Association of the Pulp and Paper Industry. Incorporated in 1870, the Atlantic Refining Company became a unit of the Standard Oil Organization in 1874, but again became a completely independent company following the dissolution of the Standard Oil Company in 1911.

At that time the company operated three major refineries—one in eastern Pennsylvania, at Philadelphia; and two in western Pennsylvania, one at Pittsburgh and the other at Franklin. Its domestic marketing organization was confined to Pennsylvania and Delaware. It has no oil production, no pipe lines, no tankers. It had almost no working capital as this had been supplied by Standard Oil. It owed more than $9,000,000 to its former associates.

During the succeeding years the Atlantic Refining Company has become one of the country's major independent oil companies with a domestic marketing organization covering most of the Atlantic seaboard and extending into the Middle West. In 1915, during the presidency of J. W. Van Dyke, now chairman of the board, it built the first modern service station, in Pittsburgh, Pa., and almost over-night revolutionized the method of distributing motor fuel and lubricants to the motoring public.

Under Mr. Van Dyke's leadership the company has widely extended its line of products used by the motoring public, householders and industry. Waxemul, an emulsifiable paraffin wax used in the manufacture of water-repellent paper, is one of the newest products developed for industrial use. Among other industrial-use products are lubricating oils and greases, technical and white oils, naphthas and solvents.

The company has built modern refineries, one at Philadelphia and one at Atreco, Texas. Large oil producing properties have been acquired from which the company produced more than 12,000,000 42-gallon barrels of crude oil in 1938. The company owns or controls more than 2200 miles of pipe line linking the storage terminals of the Atreco refinery with the oil fields, and carrying the products of the Philadelphia refinery to markets in Pennsylvania and western New York.

A tanker fleet has been created numbering 24 vessels with a total deadweight tonnage of 252,000. Latest additions to this fleet are the S.S. J. W. Van Dyke and the S.S. Robert H. Colley, the world's largest welded ships and the first American-built turbo-electric tankers. It is estimated that in steady operation between Texas Gulf ports and Philadelphia these two new units of the Atlantic fleet could carry enough gasoline to meet the requirements of a community of 2,000,000 people.

The Atlantic Refining Company will be represented in the Technical Association by Charles F. Kennedy.

An Investigation of the Optical Scattering and Absorption Coefficients of Dyed Handsheets and the Application of the I.C.I. System of Color Specification to These Handsheets*

By William J. Foote [1]

Abstract

The reflectance curves of dyed sheets as determined by a spectrophotometer are of value for at least four reasons: (1) They evaluate a fundamental value of the sheet. (2) If two sheets have the same spectral reflectance curves, they will match in color under any kind of illumination for any observer. (3) The curves may be used roughly to identify the dyes used in coloring the sheets. (4) The curves form a basis for making an estimate of the amount of dye necessary for matching an unknown sheet.

After a discussion of tristimulus values, trichromatic coefficients, dominant wavelength, and excitation purity, it is shown how these physical concepts may be used for the formulation of the specifications of dyed handsheets through the use of color-mixture diagrams and, further, how such diagrams may be used in color matching. The work presented in this paper seems to be of a highly theoretical nature and scarcely applicable to mill control of the manufacture of colored papers, but at least one mill is using the spectrophotometer as a means of matching colors and as the final check of the color of a dyed sheet.

Color measurement in the paper industry has been entirely subjective until the last few years. Even today all color furnishes, with a few exceptions, are left to the discretion of color men, who, it must be admitted, develop with experience a remarkable proficiency in their art. Nevertheless, there is confusion between producer and consumer, occasioned chiefly by the lack of a common color terminology and by the variations in individual responses to a given color stimulus. Judd (*1*) showed a rather wide variation in the grading of white papers by experienced graders who were tending to confuse hue and brightness.

There are various systems for describing colors and for measuring and specifying color stimuli. The simplest way of describing colors is to have a name for each sensation. Such a system, however, is entirely inadequate for specifying colors which differ just perceptibly.

If, instead of naming colors, a sample is used to designate the color in question, another system of classification, the color chart or color standard, is introduced. The dictionary of Maerz and Paul (*2*) and the system of Munsell (*3*) are the best-known and most widely-used systems of this type.

The various types of instruments used for measuring color may be listed as follows: (*a*) additive and subtractive colorimeters using material color standards, (*b*) monochromatic and trichromatic colorimeters using primaries, (*c*) visual and photoelectric filter photometers, (*d*) spectrophotometers.

The fundamental defects of color standards and of instruments using color standards are that the materials lack permanence, uniformity, and reproducibility, and that they have only a limited range. The personal equation, a result of differences in color vision which may cause results by normal observers to differ significantly, is a defect of any visual instrument.

In filter photometry, results are limited by the number of filters available, by incomplete freedom in the selection of wavelengths, and by the relatively large wavelength range transmitted by the available filters.

The fundamental physical limitations of any photoelectric trichromatic instrument have been pointed out by Van den Akker (*4*). A spectrophotometer, on the other hand, gives a complete description of the fraction of the radiant energy reflected at each wavelength of the visible spectrum.

Color may be defined as the sensation produced in the brain of an observer by the action of light on the retina of the eye. Sources of light commonly associated with colorimetry produce a continuous spectrum, i.e., light of all wavelengths from 400 mmu to 700 mmu is present simultaneously. Color measurement thus resolves into the problem of finding out how much light of each wavelength is received by the eye.

The color of a sheet of paper depends upon the spectral energy distribution of the light reflected from it and seen by the eye. For example, a piece of green paper illuminated by white light reflects light of all wavelengths, but it reflects more green than red or blue light. If it were illuminated by monochromatic red light, it would appear to be red. A perfect white body reflects 100 per cent of the light of all wavelengths of the visible spectrum; a perfect black body, no light of any wavelength. Colored bodies reflect light perferentially; under a given geometry of illumination, they will reflect a definite percentage of the light of each wavelength incident upon them.

If the reflection factor at each wavelength is

---

* Presented at the Fall Meeting of the Technical Association of the Pulp and Paper Industry, Green Bay, Wis., September 8-10, 1938. A portion of a thesis submitted in partial fulfillment of the requirements of The Institute of Paper Chemistry for the Degree of Doctor of Philosophy from Lawrence College, Appleton, Wis., June, 1938.

[1] Member TAPPI, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.

plotted against wavelength, a spectral reflectance curve is obtained. This curve represents a property of a material which is independent of the spectral energy distribution of the source and is usually expressed in comparison with the reflectance of a standard white, e. g., magnesium oxide.

The color of an object depends upon the energy distribution of the source, as well as upon the reflecting characteristics of the object itself. In order to avoid confusion of terms it is necessary to reemphasize the definitions of the terms *color* and *spectral energy distribution.* They stand in the relation of cause and effect: radiant energy (hereafter referred to as a "stimulus") effects a sensation of color.

The spectral energy distribution of stimuli can be measured accurately by physical means, but the color produced can be determined only by direct visual observation. Modern practice in the specification of a stimulus in terms of its psychophysical effect is to find a measurable equivalent stimulus which will excite the same sensation in the brain of the observer. The difficulty encountered here is that, in addition to the fact that about 4 per cent of the population is color blind (*5*), there are variations in sensitivity, even among people who are considered to have normal color vision. Therefore, in order to establish a common basis for a system, the equivalent stimuli must be evaluated in terms of their effect on the brain of a standardized normal observer.

The spectral reflectance curve is the most fundamental basis for a color specification, but it does not, in itself, completely specify the color. However, it may serve as an accurate basis for computing a minimum of three numbers which will specify the color under certain standardized conditions of illumination and of viewing for a standard observer.

The trichromatic nature of color vision was noted as early as 1807 by Thomas Young, who suggested that the eye reacts as though it contains three sets of nerves, each set being sensitive to a different, but overlapping, part of the spectrum: red, green, and violet. The three sets of nerves have never been isolated, but if their existence, or that of some other physiological mechanism which reacts essentially in the same manner, is assumed, it is possible to determine the spectral sensitivity of each set by collecting color mixture data. The sensitivity curves (known as excitation curves) are based on the fact that color created by the action of any stimulus may be specified for a given observer by finding a second stimulus which is equivalent to the one specified. The second stimulus is generally an additive combination of three suitably chosen primary stimuli. This system is called the tristimulus system of color specification and is of importance because the numerical specification of any complex color stimulus is obtained by adding the specifications of the component stimuli. Therefore, equivalent stimuli for an observer may be computed from his tristimulus specifications of the spectrum stimuli, since any real color may be considered to be the result of the action of a number of spectrum stimuli or of a combination of a spectrum stimulus and a standard white. The tristimulus specifications of the spectrum colors of small wavelength intervals are determined by well-known photometric procedures.

The tristimulus values ($\bar{x}$, $\bar{y}$, and $\bar{z}$) adopted by the International Commission on Illumination (I. C. I.) in 1931 (*6*) represents the amount of each primary required to match a unit quantity of radiant energy of the different wavelengths based on the slightly smoothed average (*7*) of Wright's (*8*) and Guild's (*9*) seventeen observers after the actual values had been transformed to a set of three unreal stimuli.

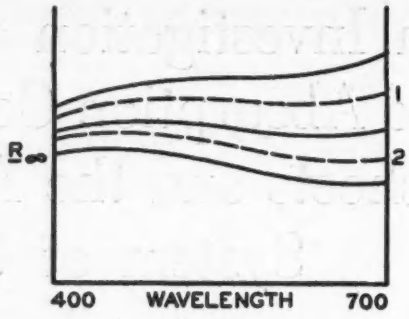


FIG. 1.
Spectral Reflectance Curves of Nigrosine Dyeings.

Comprehensive explanations of the 1931 I. C. I. coordinate system and standard observer are given by Judd (*6*), Hardy (*10*), Gibson (*11*), Smith and Guild (*12*), Razek (*13*), and in Instrumentation Studies XX (*14*).

The tristimulus values for specifying the color of a paper may be obtained by integrating the product, at each wavelength, of the relative amount of energy emitted by the source of light, the reflection factor of the sample, and each of the three excitation factors.

This method is the basis of the proposed tentative TAPPI methods for the specification of the color of pulp (*15*) and of paper (*16*).

Application

The use of the I. C. I. standard observer and coordinate system for specifying the color of paper and as a guide in color matching was demonstrated by measuring the spectral reflectance curves of handsheets of various commercial pulps dyed with representative dyestuffs. The General Electric (G. E.) recording spectrophotometer was used to determine the spectral reflectance curves. The surface of the magnesium carbonate block used as a comparison standard was freshly prepared every day and read 99.8 to 100.0 per cent as tested on the G. E. reflection meter.

The spectral reflectance curve of a colored sheet is in itself of value for four reasons: (*a*) it evaluates a fundamental property of the sheet; (*b*) if two sheets have the same spectral reflectance curve, they will match in color under any kind of illumination for any observer; (*c*) the curves may be used roughly to identify the dyes used in coloring the sheets; and (*d*) the curves form a basis for making an estimate of the amount of dye necessary for matching an unknown sheet. The theoretical relationship proposed by Kubelka and Munk (*17*) offers a means of determining quantitatively the amount of dye required to yield a certain reflectance value within a certain weight range of dyeing.

Instead of using the fundamentally accurate but tedious process of applying the Kubelka and Munk equation at many wavelengths throughout the visible spectrum, it is possible to make a roughly quantitative estimation by merely inspecting a family of spec-

tral reflectance curves. For instance, in Fig. 1 the solid lines represent the spectral reflectance of ½-, 1-, and 3-pound dyeings of Nigrosine WSJ powder on unbleached sulphite pulp. An unknown sample has a reflectance curve represented by the broken line 1. It may be estimated that a ¾-pound dyeing of Nigrosine on the unbleached sulphite used in making the standard curve would match this sample closely. The interpolation is not linear, since the reflectance decreases less per unit weight of dye when the dyeing is heavy. For example, broken line 2 in Fig. 1 represents only about 1.5 pounds of dye, although it is apparently midway between the 1- and 3-pound dyeings. The criterion for approximating the amount of a single dye in a sheet is obtained by inspecting the standard curves to see how the spectral reflectance curves decrease with increasing weight of dye. Of course these represent very simple cases. In commercial practice the number of unknown samples which can be matched using only one dyestuff will be very small.

The reflectance curves also are of great value in identifying the dyes used in coloring a sample whose furnish is unknown. Fig. 2 presents four curves of unknown samples encountered during the work on color matching. After the standard curves have been inspected, it is obvious that curve 6 in a bleached sulphite base stock dyed with approximately ⅜ of a pound of Brilliant Paper Yellow and a trace of red. The pulp furnish, of course, cannot be determined from the spectral reflectance curve alone. The groundwood used in this study had a reflectance curve very similar to that of the unbleached sulphite. Consideration must be paid to the type of paper which is to be matched and to the types of pulps available for matching purposes. The spectral reflectance curves of deep shades of green on kraft and on unbleached sulphite might be so close together that the type of pulp could not be distinguished. But there is not much chance of confusing the base stocks used in commercial practice. For the majority of cases the spectral reflectance curve will serve to indicate whether the base stock is highly purified bleached or unbleached sulphite, or unbleached kraft. Curve 5 indicates that the dyes used were Methylene Blue (absorption maximum near 660 mmu) and Methyl Violet (absorption maximum near 590 mmu) on a kraft base stock. Curve 7 was dyed, or could be matched, with about 1.75 pounds of Safranine and a trace of yellow. Curve 4 may be matched with Methylene Blue and Methyl Violet with perhaps a bit of yellow to reduce the reflectance in the violet.

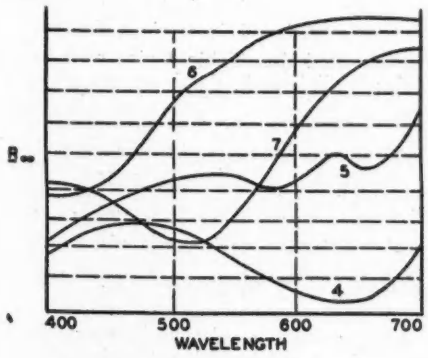


FIG. 2.
Spectral Reflectance Curves of Unknown Dyeings.

CONVERSION OF SPECTRAL REFLECTANCE CURVES TO TRISTIMULUS VALUES AND TRICHROMATIC COEFFICIENTS

The first step in establishing color specification of paper samples on a rational physical basis is to calculate the tristimulus values for the sample from the spectral reflectance curve. The method of evaluating the color in terms of an equivalent stimulus exciting the same sensation is to obtain first the tristimulus values, X, Y, and Z, by integrating the product of the spectral energy distribution, E, of the source (usually I. C. I. illuminant C) times the spectral reflectance of the sample, R, times the tristimulus values (excitation factors), $\bar{x}$, $\bar{y}$, and $\bar{z}$, over the range of the visible spectrum.

The process may be expressed by the three integrals:

$$X = \int_0^\infty E\bar{x}R\,d\lambda,$$

$$Y = \int_0^\infty E\bar{y}R\,d\lambda, \text{ and}$$

$$Z = \int_0^\infty E\bar{z}R\,d\lambda,$$

where λ is the wavelength.

However, for computational convenience the indicated integrals are usually approximated by the determination of the finite sums:

$$X = \sum_{380}^{780} E\bar{x}R\Delta\lambda$$

$$Y = \sum_{380}^{780} E\bar{y}R\Delta\lambda$$

$$Z = \sum_{380}^{780} E\bar{z}R\Delta\lambda \quad .$$

There are three methods of calculating tristimulus values. In the weighted ordinate method *(10)*, a summation is made of the values of $E\bar{x}R$, $E\bar{y}R$, and $E\bar{z}R$ at equal wavelength intervals (usually 10 mmu); i.e., $\Delta\lambda$ is constant.

In the selected ordinate method *(10)*, the wavelength intervals are so chosen as to give constant values to $E\bar{x}\Delta\lambda$, $E\bar{y}\Delta\lambda$, and $E\bar{z}\Delta\lambda$ and a summation of R values, taken at the medium wavelength of these wavelength intervals, is made. The three sums are then multiplied by factors which are proportional to the three constants: $E\bar{x}\Delta\lambda$, $E\bar{y}\Delta\lambda$, and $E\bar{z}\Delta\lambda$.

The third method of calculating tristimulus values is to evaluate the integrals either by graphical or by mechanical integrations.

The method used in this study was to evaluate the tristimulus values by means of a mechanical integrator which automatically multiplies R and $E\bar{x}$ at each wavelength and integrates this product for the spectral range from 400 to 700 mmu. The multiplication and integration is repeated for the products of R and $E\bar{y}$ and of R and $E\bar{z}$. The integrator values were checked each time by repeating the integration

from 700 to 400. The averages of the two readings were reported. The average difference between the integrator values and the reported average for 600 trials was ± 0.09.

As it is not easy to visualize color in numerical terms, many attempts have been made to specify stimuli as points on either trilinear or Cartesian coordinate systems. In order to obtain points on a coordinate system which will be independent of the choice of units, the concept of trichromatic coefficients has been introduced. They are related to tristimulus values as follows:

$$x = X/S,$$
$$y = Y/S, \text{ and}$$
$$z = Z/S,$$

where $S = X + Y + Z$. Since the sum of the trichromatic coefficients is unity, any two may be used as the ordinate and abscissa scale for a coordinate chart. These charts are called color mixture diagrams because additive combinations of stimuli are represented according to the center of gravity principle. The x, y diagram is the one commonly used. The I. C. I. system of color specification has been so designed that the Y tristimulus value also measures the visual efficiency or brightness of a sample relative to that of magnesium oxide. Since two colors may have equal chromaticities but different visual efficiencies, a complete color specification must include the Y tristimulus value as well as the trichromatic coefficients x and y.

The effect on trichromatic coefficients of a change of 0.1 in the tristimulus value amounts, in most ranges, to about 0.0006 unit. A general rule-of-thumb for evaluating deviations in values of x and y in psychological terms is that a change of 0.001 in x or y will correspond to a least perceptible difference in color. At present there are not enough data available to state how many least perceptible differences will be allowable in a commercial match. Nutting

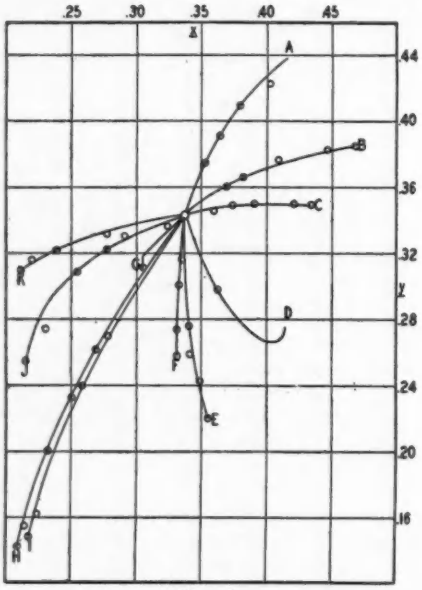


FIG. 3.

Color Mixture Diagram for Basic Dyes on Unbleached Sulphite. A Auramine, B Chrysoidine GN, C Basic Brown BR, D Safranine, E Fuchsine, F Rhodamine B, G Nigrosine WSJ, H Paper Blue R, I Methyl Violet NE, J Methylene Blue ZX, K Victoria Green SC.

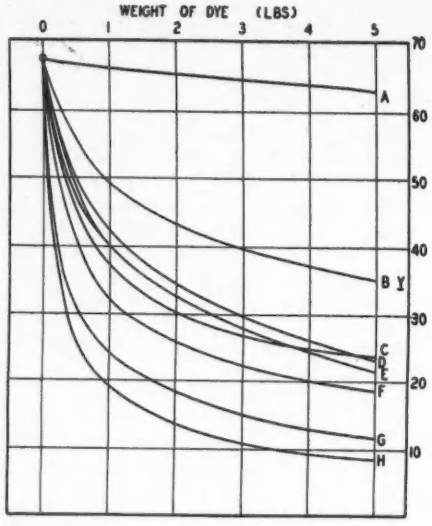


FIG. 4.

Visual Efficiency vs. Weight of Dye for Basic Dyes on Unbleached Sulphite. A Auramine, B Rhodamine and Chrysoidine, C Safranine, D Basic Brown, E Nigrosine and Methylene Blue, F Victoria Green, G Fuchsine, H Methyl Violet and Paper Blue R.

(*18*) found the average difference between sample and match in x and y values for 41 satisfactory commercial matches of color on dyed textiles to be 0.0045. This difference is, however, greater than that which would be generally allowable in the case of paper color matches.

Specification of the Color of Dyed Handsheets

The I. C. I. system is additive in nature, but the color of paper produced by the combination of pulp plus dye is the result of a subtractive process. Nevertheless, for the purpose of specifying the color of paper in terms of physical stimuli, the I. C. I. system is entirely satisfactory because the color of the sheet is the result of the additive mixture of light of the various wavelengths reflected from the sheet.

Trichromatic coefficients of handsheets of unbleached sulphite dyed with basic dyes are given in Table I and are plotted on the x, y color mixture diagram in Fig. 3. The illuminant assumed in all the work reported herein was the I. C. I. standard illuminant C, which is a close representation of average daylight. Nutting *(19)*, using the trichromatic coefficients of dyed textiles, presents curves having the same general shape. The coefficients for basic dyes on bleached sulphite, kraft, and groundwood, and for acid and direct dyes on bleached and unbleached sulphite were tabulated and drawn in a similar manner.

It will be noted that Table I also contains values of Y (visual efficiency), dominant wavelength, and excitation purity for the different handsheets. These three are objective specifications corresponding to the three subjective attributes of color, viz., brilliance (value), hue, and saturation (chroma). The complete specification of the color of a sheet of paper may be given by either x, y, and Y, or by dominant wavelength, excitation purity, and visual efficiency.

Relation of Visual Efficiency and Concentration

Fig. 4 indicates the relation between the visual efficiencies of colored handsheets and the weight of dyeing for basic dyes on unbleached sulphite. This

TABLE I
BASIC DYES ON UNBLEACHED SULPHITE

Wt. lb.	x	y	Y	Dominant Wavelength	Excitation Purity
		Nigrosine WSJ			
¼	.3245	.3363	54.9	573.0	9.2
½	.3176	.3295	48.2	570.0	5.4
1	.3108	.3241	40.0	556.0	2.2
3	.3043	.3180	29.4	494.2	2.0
5	.3057	.3123	21.4	481.0	2.0
		Basic Brown BR			
¼	.3588	.3472	56.8	584.0	21.3
½	.3742	.3498	49.7	586.6	26.1
1	.3911	.3507	42.3	589.3	30.9
3	.4211	.3502	28.7	593.7	38.8
5	.4361	.3489	23.1	595.8	42.3
		Paper Blue R			
¼	.2680	.2635	33.1	473.0	21.7
½	.2497	.2332	25.5	470.4	32.2
1	.2295	.2011	18.8	469.2	43.9
3	.2126	.1551	10.6	463.0	57.3
5	.2089	.1407	8.4	459.8	61.3
		Rhodamine B			
¼	.3344	.3273	60.0	589.3	9.6
½	.3347	.3172	55.9	610.0	6.9
1	.3329	.3013	49.0	499.0c	10.3
3	.3300	.2751	40.4	518.2c	20.2
5	.3317	.2590	35.1	525.8c	27.1
		Victoria Green SC			
¼	.2770	.3331	47.4	497.1	11.2
½	.2579	.3290	41.0	493.9	18.4
1	.2410	.3231	31.9	492.2	25.1
3	.2190	.3160	22.5	490.9	34.0
5	.2097	.3091	18.3	490.3	47.9
10	.2071	.3059	13.4	489.7	39.0
20	.2068	.3005	10.2	489.1	39.7
		Safranine T Extra			
¼	.3540	.3093	51.0	493.0c	11.2
½	.3613	.2986	44.9	495.2c	16.7
1	.3761	.2812	36.9	497.4c	26.3
3	.4010	.2677	26.7	497.4c	36.6
5	.4136	.2746	23.3	495.8c	36.2
10	.4398	.2854	18.5	493.8c	36.5
20	.4532	.2882	14.3	493.4c	38.0
		Fuchsine Concentrated Powder			
¼	.3395	.2777	37.4	507.8c	21.0
½	.3414	.2595	30.2	514.8c	28.8
1	.3478	.2435	24.1	516.6c	36.3
3	.3544	.2197	14.5	520.0c	47.2
5	.3566	.2213	11.7	518.0c	46.8
		Chrysoidine GN			
¼	.3672	.3605	59.9	581.0	27.1
½	.3864	.3678	55.1	583.1	34.2
1	.4077	.3762	50.7	584.6	42.0
3	.4465	.3836	40.3	587.4	54.7
5	.4664	.3850	36.1	589.0	60.3
10	.4905	.3775	29.8	592.4	64.8
20	.4968	.3720	24.5	594.0	64.8
		Auramine			
¼	.3527	.3747	67.1	573.0	26.9
½	.3665	.3934	66.6	573.3	35.8
1	.3790	.4095	66.0	573.5	43.3
3	.4019	.4331	64.8	574.2	55.9
5	.4152	.4386	63.1	575.5	61.0
		Methylene Blue ZX			
¼	.2897	.3318	53.3	500.0	6.8
½	.2735	.3215	46.9	492.6	12.3
1	.2555	.3098	40.1	489.5	20.7
3	.2288	.2743	27.6	484.4	34.1
5	.2173	.2555	21.5	482.7	40.2
10	.2115	.2145	12.5	477.0	47.6
20	.2199	.2172	9.6	476.9	44.4
		Methyl Violet NE			
¼	.2782	.2700	35.5	468.3	15.7
½	.2584	.2400	26.9	468.0	28.6
3	.2230	.1625	11.3	458.0	53.2
5	.2170	.1477	8.3	456.4	57.8
10	.2209	.1480	6.8	453.8	56.9
20	.2295	.1403	5.3	430.0	56.9

relationship is of the same nature for other dyes and other pulps. It may be seen at a glance why Auramine and Rhodamine are bright dyes and how Fuchsine, Methyl Violet, and Paper Blue R reduce the brightness of a sheet very much when used in quantities over one-quarter of a pound.

The actual weight of dye on the fiber was obtained by using the method described by Harrison (*20*). It involves transmission measurements on the white waters from each handsheet, calculation of the concentration of dye in the white water by means of Beer's law, and calculation of the weight of dye on the fiber by difference. Any type of interpolation is difficult at dyeings of one pound or less, as it is hard to read the values from the curve with any degree of accuracy.

Various equations were applied to the data in an attempt to find a set of coordinates which would yield a straight line so that values could be read more accurately. An empirical relation used by Bruce (*21*) in investigating the tinting strength of pigments was found to fit the data satisfactorily. The relation is:

$$[Y - A]/[Y_0 - A] = a\sqrt{c},$$

where A and a are constants of the equation and Y_0 is the visual efficiency of the base stock. When plotted in the form:

$$\log [Y - A]/[Y_0 - A] = \sqrt{c} \log a,$$

a straight line was obtained when suitable values of A were used ($\log a$ is a constant determining the slope of the line). However, A is different for every dye and even for the same dye on different base stocks. If a certain value of Y is desired, the equation is easily solved for c, the concentration of dye necessary to produce the desired Y, provided that empirical data are available for evaluating the constant, A.

Dominant Wavelength

Dominant wavelength is defined as the wavelength of the spectrum stimulus which must be added to the light of the illuminant in order to match the stimulus of a given color. From this definition it is obvious that the value of the dominant wavelength depends upon the choice of illuminants. I. C. I. illuminant C was selected because it is an approximation of average daylight, which is the light under which most visual color judgments are made.

Fig. 5 shows the family of Victoria Green SC dyeings on unbleached sulphite plotted on the color mixture diagram. The heavy line represents the loci

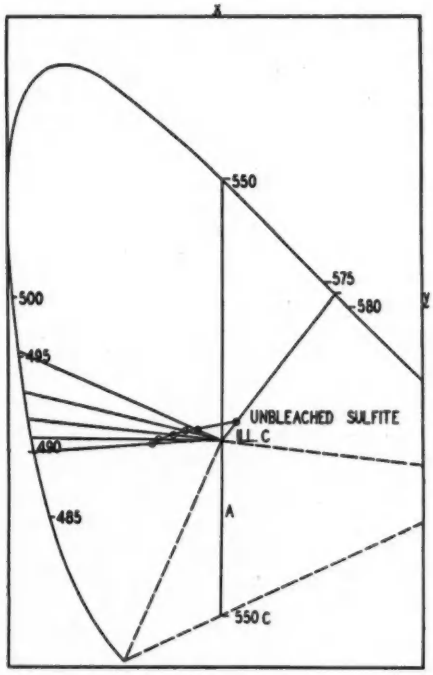


FIG. 5.
Color Mixture Diagram.

of spectrum stimuli. The dominant wavelength of the 5-pound dyeing is 490 mmu. This fact means that a suitable mixture of light of 490 mmu wavelength and of light of illuminant C will produce a color that the standard observer would consider identical to the color of the 5-pound Victoria Green dyeing.

No points between the broken lines can be matched with a combination of pure spectrum color and illuminant. However, the concept of dominant wavelength may be extended to cover this area. Point *A* in Fig. 5 may be said to have a dominant wavelength of 550c, meaning that a stimulus which is complementary to the spectrum stimulus having a wavelength of 550 mmu must be added to the stimulus of illuminant C to match the stimulus specified by point *A*. Another way of looking at it is to consider adding a stimulus of wavelength 550 mmu to stimulus *A* to produce a stimulus specified by illuminant C. The reason for stressing this portion of the color mixture diagram is that several important papermaking dyes fall into it, e.g., Rhodamine and Fuchsine.

Excitation Purity

Excitation purity is defined as the ratio of the distance between the points specifying the illuminant and the sample color to the distance between the points specifying the illuminant and the spectrum color which defines the dominant wavelength of the sample color. In the case of the 5-pound dyeing of Victoria Green SC on unbleached sulphite, the ratio of the two distances is 0.381. The excitation purity is 38.1 per cent, since that of the illuminant is zero and that of the spectrum colors is 100 per cent.

Colorimetric purity is defined as the ratio of the luminosity of the spectrum color which must be added to the illuminant to match a given color to the luminosity of the spectrum color and illuminant. The reason for using excitation purity instead of colorimetric purity is that the values of the former are always positive and its contours on a color mixture diagram are always continuous. Hardy (*10*) gives equations for interconversions of the two. Linear measurements may not be accurate enough for all cases. Formulas for calculating excitation purity directly from trichromatic coefficients have been derived by Hardy (*10*), Judd (*22, 23*), and Priest (*24*).

Data on Handsheets Containing Mixtures of Dyes

The curves representing the trichromatic coefficients of families of dyeings on various pulp furnishes were similar in shape and slope, apparently being distorted merely through displacement of the reference point (i.e., the undyed pulp). For instance, the curve for Safranine on a 50-50 furnish of bleached and unbleached sulphite was parallel to the dyeings on either pulp alone and approximately midway between them. Therefore all measurements made on more complex color furnishes were made on unbleached sulphite. Basic dyes were used because they possess high retention and because chemical reaction between dyes was not desired.

To illustrate the fact that all handsheets dyed with two dyes had loci on the color mixture diagram lying between limits established by the loci of sheets dyed with either component, a series of mixed dyeings was made in which two dyes whose families of trichromatic coefficients were close together, Fuchsine and Safranine, were used. Contour lines may be drawn through points representing constant total weight of dye and points representing a constant ratio between amounts of dye components.

TABLE II
MIXTURES OF BASIC DYES ON UNBLEACHED SULPHITE

A—Safranine T
B—Chrysoidine GN

Wt. *A* lb.	Wt. *B* lb.	*x*	*y*	*Y*	Dominant Wavelength	Excitation Purity
½	½	.3628	.3348	53.0	592.0	19.1
¾	¾	.3779	.3323	48.1	596.4	22.4
½	½	.3979	.3301	41.6	601.0	27.2
1	1	.4229	.3307	35.2	603.0	34.0
3	3	.4702	.3289	25.7	607.2	46.1
5	5	.4800	.3323	21.7	605.8	49.9
½	½	.3833	.3490	50.9	588.8	28.3
½	¾	.4049	.3514	44.8	591.2	34.6
¼	1¼	.4333	.3663	40.8	590.0	46.4
1	3	.4580	.3540	31.9	596.0	48.4
½	½	.3728	.3178	46.5	613.0	17.4
¾	¾	.3921	.3128	40.0	625.0	21.1
1¼	¼	.4052	.2971	32.6	493.4c	25.8
3	1	.4382	.3089	27.1	628.0	32.3
⅜	⅛	.3839	.3041	39.3	493.2c	18.6
⅛	⅜	.4068	.3628	47.6	587.8	38.2
½	1½	.4303	.3562	39.1	592.7	43.0
1½	½	.4112	.3102	33.5	630.0	25.3

The four chief types of spectral reflectance curves are those representing red, blue, yellow, and green. Mixtures were made in which all six possible combinations of dyes of these four chief types were employed. The quantities used were designed to yield the most information for drawing contour lines with the least number of points. The data are presented in Table II. The contour lines are illustrated in Fig. 6, which gives the trichromatic coefficients of mixtures of Chrysoidine and Safranine in the color mixture diagram.

To simplify the terminology, the following conventions will be used:

(a) The dye whose wavelength of maximum light absorption is the shorter will be called dye *A*; the other component will be called dye *B*.

(b) The percentage of dyes in the mixture will be expressed as a decimal of *A*. For example, point *x* in Fig. 6, which represents the trichromatic coefficients of a handsheet dyed with 1.5 pounds of Chrysoidine and 0.5 pound of Safranine, will be designated as "2 pound total, 0.75 Chrysoidine." The points *x* and *y* will be called, respectively, "2 pound total, 0.5 Chrysoidine" and "2 pound total, 0.25 Chrysoidine."

In overlapping cases it would be possible to produce two sheets having identical trichromatic coeffi-

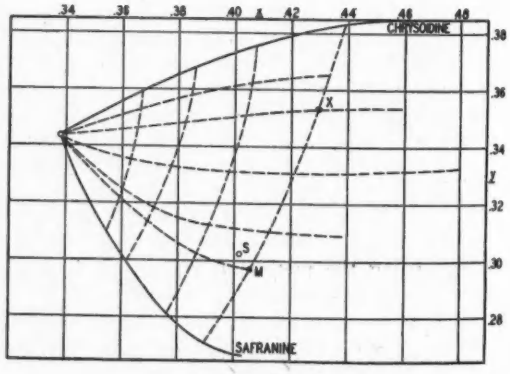


FIG. 6.
Color Mixture Diagram for Mixtures of Safranine T Extra and Chrysoidine GN on Unbleached Sulphite.

cients by using two different combinations of dyes. For example, the color of a sheet dyed with 1.5 pounds of Safranine and 1.5 pounds of Methylene Blue is specified by $x = 0.2763$, $y = 0.2504$, and $Y = 19.3$. The trichromatic coefficients could be matched by using a combination of Fuchsine and Victoria Green of approximately "0.75 pound total, 0.5 Fuchsine," yielding identical values of x and y but a value of $Y = 24.0$. The two sheets would match for hue and purity but the difference in Y value would spoil the match, since it is larger than that which corresponds to a just perceptible difference.

Visual Efficiency of Mixtures

The value of Y for any proposed mixture may be obtained by interpolation between experimentally determined values. For instance, in the case of mixtures of Chrysoidine and Safranine, the experimentally obtained values for Y are given in Table III. It must not be assumed that an empirical relationship for one combination of dyes will fit that for another. In the case of combinations of Methylene Blue and Safranine, the visual efficiencies of mixtures of a certain total weight were consistently lower than those of a similar weight of either component.

TABLE III.
Y VALUES FOR MIXTURES OF SAFRANINE AND CHRYSOIDINE

Total	Dye (pounds)...	¼	½	1	2	3	4	5	10
0.000	Chrysoidine.....	51.0	44.9	36.9	...	26.7	...	23.3	18.5
0.125	Chrysoidine.....	...	...	39.3	32.6	...	...	...	...
0.250	Chrysoidine.....	...	46.5	40.0	33.5	...	27.1	...	...
0.500	Chrysoidine.....	53.0	48.1	41.6	35.2	...	...	...	21.7
0.750	Chrysoidine.....	...	50.9	44.8	39.1	...	31.9	...	...
0.875	Chrysoidine.....	...	...	47.6	40.8	...	...	...	...
1.000	Chrysoidine.....	59.9	55.1	50.7	...	40.3	...	36.1	29.8

The Use of Color Mixture Diagrams in Color Matching

It will not always be possible to obtain perfect physical matches in color matching because it may be necessary for economic reasons to use dyestuffs in matching a sample different from those used in manufacturing it. In addition, the approach must be empirical *(a)* because the absorption coefficient of a dye is not directly proportional to its concentration on the fiber and *(b)* because the color of a pulp containing a mixture of dyes will not be specified by the center of gravity principle (additive process), since the amount of light reflected from a colored sheet is determined by a subtractive process.

The information obtained from handsheets dyed with single dyes or combinations of dyes may be used as an aid in matching the colors of unknown samples. An example of the procedure used will be given. The sample of unknown dye or fiber finish was labelled "cherry bond." The spectral reflectance curve was measured on the G. E. recording spectrophotometer and the trichromatic coefficients calculated. The specification of the color of the sample, using illuminant C as the illuminant, was $x = 0.4043$, $y = 0.3006$, and $Y = 35.3$. A glance at Fig. 3 would indicate that the point specifying the color of the unknown sample lies between the loci of the specifications of the families of curves of Safranine and Chrysoidine. Therefore, the sample could be matched with respect to hue and purity by a suitable combination of these two dyes. The other point which must be satisfied before a match is made is that the visual efficiency obtained by a mixture of these two dyes will approximate that of the sample.

Figure 6 shows an enlarged portion of the color mixture diagram which contains all the necessary data for specifying a dye furnish to match the chromaticity of the unknown. The point S specifies the sample to be matched. Since a sheet whose color was specified by point M was immediately available, a visual comparison was made. The color of the sheet specified by point M was bluer, deeper, and duller than the sample specified by point S. This visual analysis is completely consistent with the objective specification which shows that the sheet specified by M contains more total dye and contains a higher proportion of Safranine than the sample. Y for the sheet specified by M is 32.6 as compared to 35.3 for the sample.

The broken lines represent contour lines arbitrarily interpolated in view of the general features of the loci on the color mixture diagram. They indicate that the sample may be matched by the following specification: "1.75 pound total, 0.156 Safranine."

An interpolation of visual efficiencies is permissible in two cases: *(a)* if the value for the sample lies within a narrow range between empirically determined values and *(b)* if the value is in such a range that the variation of Y with weight of dyeing is practically a straight line.

A linear interpolation between the values for visual efficiency (for the same points for which chromaticity interpolations were made) will yield a value of $Y' = 34.5$ for the specification, "1.75 pound total, 0.156 Chrysoidine." This was fairly close to the visual efficiency of the sample, 35.3. Therefore a sheet was made using the following furnish: 100 per cent unbleached sulphite, 1 pound, 7.6 ounces Safranine, and 4.4 ounces Chrysoidine.

The resultant sheet was judged to be a commercially acceptable color match by an expert color man. It is to be emphasized that this match was obtained on the first attempt with no visual examination of the sheet at any stage in determining the specification of the furnish to be used in matching the sample.

Other samples used in testing the applicability of this method for matching colors included shades and tints which are recognized as being difficult to match. A nominal description of the samples matched follows:

1S Deepgreen on kraft wrapping paper
2S Tinted blue-gray bond paper
5S Light green-gray kraft
6S Bright yellow bond
7S Heavy cherry bond
8S Light reddish-buff kraft
9S Neutral gray sulphite wrapping
10S Reddish tinted mimeo
11S Deep blue kraft
12S Light lavender mimeo

The specifications of these samples appear in Table IV.

TABLE IV
COLOR SPECIFICATION OF COMMERCIAL SAMPLES

Sample	x	y	Y	Dominant Wavelength	Excitation Purity
1S	.2828	.3598	20.1	512.0	7.6
2S	.3173	.3296	51.4	569.9	5.3
5S	.3202	.3390	40.5	567.0	8.8
6S	.3676	.3846	74.9	575.2	35.8
7S	.4043	.3006	35.3	493.0c	24.0
8S	.3580	.3521	45.0	581.7	22.3
9S	.3004	.3073	29.1	479.8	4.6
10S	.3417	.3456	63.2	578.4	16.5
11S	.2469	.2426	9.0	475.0	31.8
12S	.3281	.3278	44.0	581.7	7.8

On the basis of the position of stimuli specifying the color of the commercial samples, the furnishes specified in Table V were made. It was assumed that, in drawing contour lines for cases other than

TABLE V.—FURNISH SPECIFICATIONS FOR MATCHING COMMERCIAL SAMPLES

No.	Pulp	Dyes	Total Wt.	Ratio	
1M	Kraft	A—Chrysoidine B—Victoria Green	3½ lb.	0.43	A
2M	Unbleached Sulphite	A—Nigrosine WSJ	½ lb.	1.0	A
5M	Kraft-Unbleached Sulphite	A—Methylene Blue B—Methyl Violet	¼ lb.	0.5	A
6M	Bleached Sulphite	A—Brilliant Paper Yellow B—Fast Red 8BL	¾ lb.	0.9	A
7M	Unbleached Sulphite	A—Chrysoidine B—Safranine	1¾ lb.	0.156	A
8M	Kraft	A—Fuchsine B—Methyl Violet	4 oz	0.625	A
9M	Unbleached Sulphite	A—Nigrosine B—Methyl Violet C—Methylene Blue	2 5/64 lb.		
10M	Unbleached Sulphite	A—Chrysodine B—Basic Brown	½ oz.	0.5	A
11M	Kraft	A—Methyl Violet B—Methylene Blue	4¾ lb.	0.7	A
12M	Unbleached Sulphite	A—Chrysoidine B—Methyl Violet	2 oz.	0.5	A

basic dyes on unbleached sulphite, the lines would have the same general shape for a given combination of dyes.

Discussion of the Comparison of the Commercial Samples and the Handsheets to Match

The handsheets, with the exception of 1M and 11M, were judged to be commercial matches. The two exceptions were correct as to chromaticity but were decidedly light. This can be seen easily by inspecting the Y values in Table VI, which gives the objective specification of the handsheets made.

TABLE VI
COLOR SPECIFICATION OF COMMERCIAL MATCHES

Sample	x	y	Y	Dominant Wavelength	Excitation Purity
1M	.2756	.3720	25.0	512.0	12.0
2M	.3180	.3312	52.3	569.7	6.0
5M	.3218	.3387	40.7	568.4	9.2
6M	.3677	.3858	75.4	575.0	34.0
7M	.3894	.2942	33.5	494.3c	23.8
8M	.3590	.3570	47.6	579.9	24.0
9M	.3005	.3010	29.1	465.0	5.7
10M	.3409	.3447	63.2	578.2	15.9
11M	.2542	.2528	10.8	475.2	27.8
12M	.3278	.3275	45.2	581.7	7.7

An inspection of the spectral reflectance curve of handsheet 6M indicated that there was not quite enough yellow dye in it. A fraction of an ounce more would have resulted in a perfect physical match. The dye furnish of handsheet 12M may be explained by the fact that the correct visual efficiency could not be obtained using the two dyes immediately enclosing the area into which the trichromatic coefficients fell.

Special attention must be directed to sheet 9M. The stimulus specified by the point 9S could be matched for chromaticity by a stimulus specifying the color of a handsheet of unbleached sulphite dyed by 3/64 pound of Methyl Violet and 1/4 pound of Methylene Blue. However, the visual efficiency of this sheet would be about 52 per cent, whereas that of the sample was 29.1 per cent. Fig. 7 is an enlargement of a portion of the master diagram for basic dyes on unbleached sulphite.

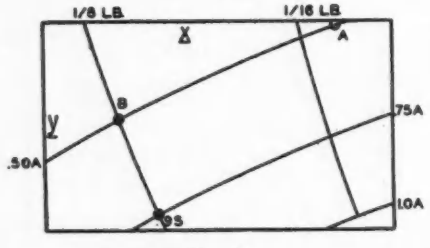


FIG. 7.
Enlarged Portion of Color Mixture Diagram for Basic Dyes on Unbleached Sulphite Pulp.

Point A specifies the color of a sheet of unbleached sulphite dyed with 3/128 pound of Methyl Violet and 3/128 pound of Methylene Blue. At the same time it also represents the color of a 2-pound dyeing of Nigrosine WSJ, which has a visual efficiency of 35.0 per cent. To change the specification of the sheet from point A to point B, which specifies the color of a sheet dyed with 1/16 pound (or 8/128 pound) of Methyl Violet and the same amount of Methylene Blue, it is obvious that in theory 5/128 pound of each dye must be added to the sheet specified by point A. Analogously, to get to point 9S from B, it would be necessary to add 4/128 pound of Methyl Violet and subtract 4/128 pound of Methylene Blue.

The over-all change in going from point A to point 9S would be an addition of 9/128 pound of Methyl Violet and 1/128 pound Methylene Blue. Since A represents a sheet containing 3/128 pound Methyl Violet and the same amount of Methylene Blue, the final specification will represent the aforementioned 3/64 pound of Methyl Violet and 1/64 pound of Methylene Blue.

If, however, 2 pounds of Nigrosine WSJ are substituted for the mixture specified by point A, the final specification of 9S will represent a sheet containing 2 pounds of Nigrosine WSJ, 9/128 pound of Methyl Violet, and 1/128 pound of Methylene Blue. This line of reasoning was justified by the results obtained, i.e., a reasonable color match. The possibility of matching visual efficiencies by substitutions of dyes having equivalent stimuli is of great importance.

Major Difficulty Encountered

The major difficulty encountered in the work on color matching was the necessity of balancing chromaticity demand against visual efficiency demand in specifying a furnish. For the cases of color matching of gray and tan tints both on kraft and on unbleached sulphite, the information presented is of importance for two reasons: (*a*) The tints are the hardest colors to specify and match visually; (*b*) the contour lines are more complete and regular in the range up to ½-pound dyeings.

Literature Cited

(1) Judd, D. B., *Paper Trade J.* 100, no. 21:40-2 (May 23, 1935); 103, no. 8:38-44 (Aug. 20, 1936).
(2) Maerz, A., and Paul, M. R. "A Dictionary of Color." 1st ed., 1930.
(3) Munsell Color Co., Inc. "Munsell Book of Color." 1929.
(4) Van den Akker, J. A., *J. Optical Soc. Am.* 27:401-7 (1937).
(5) Paine, W. S., *Industrial Standardization* 7:43-4 (1936).
(6) Judd, D. B., *J. Optical Soc. Am.* 23:359-74 (1933).
(7) Judd, D. B., *J. Optical Soc. Am.* 21:699-728 (1931).
(8) Wright, W. D., *Trans. Optical Soc. (London)* 30:141-64 (1928-1929).
(9) Guild, J., *Phil. Trans. Roy. Soc. (London)* A230:149-87 (1931).
(10) Massachusetts Institute of Technology, Color Measurement Laboratory. "Handbook of Colorimetry." 1936.
(11) Gibson, K. S., *J. Soc. Motion Picture Engrs.* 28:388-410 (1937).
(12) Smith, T., and Guild, J., *Trans. Optical Soc. (London)* 33:73-134 (1931-1932).
(13) Razek, J., *Paper Trade J.* 101, no. 13:91-5 (Sept. 26, 1935).
(14) The Institute of Paper Chemistry, *Paper Trade J.* 105, no. 18: 135-41; no. 19:27-39 (Oct. 28, Nov. 4, 1937).
(15) TAPPI, *Paper Trade J.* 106, no. 20:35-6 (May 19, 1938).
(16) TAPPI, *Paper Trade J.* 106, no. 20:36-7 (May 19, 1938).
(17) Kubelka, P., and Munk, F., *Z. tech. Physik* 12:593-601 (1931).
(18) Nutting, R. D., *Textile Research* 6:104-114 (1935-1936).
(19) Nutting, R. D., *Textile Research* 7:5-23 (1936-1937).
(20) Harrison, W. D., *Paper Trade J.* 105, no. 13:39-45 (Sept. 23, 1937).
(21) Bruce, H. D., *Bur. Standards J. Research* 1:125-50 (1928).
(22) Judd, D. B., *J. Optical Soc. Am.* 21:729-47 (1931).
(23) Judd, D. B., *J. Optical Soc. Am.* 13:133-54 (1926).
(24) Priest, I. G., *J. Optical Soc. Am.* 9:503-20 (1924); 13:123-32 (1926).

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING MARCH 4, 1939

SUMMARY

Cigarette paper .....469 cs.
Wall paper .....3 bls., 3 cs.
Wall board .....311 bdls., 1 cs.
Paper hangings .....18 bls., 5 cs.
Newsprint .....3005 rolls, 341 bls.
Printing paper .....2 cs.
Wrapping paper..46 crates, 605 rolls, 265 bdls., 47 bls., 31 cs.
Packing paper .....100 bls.
Filter paper .....39 bls., 20 cs.
Filter mass .....100 bls.
Drawing paper .....3 cs.
Metal covered paper .....25 cs.
Surface baryta coated paper .....70 crates, 10 cs.
Basic paper .....6 cs.
Photo paper .....14 cs.
Decalcomania paper .....14 cs.
Decalcomanias .....30 cs.
Transfer paper .....25 cs.
Tissue paper .....2 cs.
Air Mail paper .....1 cs.
Gummed paper .....1 cs.
Tracing paper .....4 cs.
Tracing cloth .....17 cs.
Basic board .....5 cs.
Marbled paper .....1 cs.
Paper tubes .....267 ctns., 27 cs.
Straw board .....1272 pkgs.
Miscellaneous paper .....1 crt., 140 bls., 6 cs.

CIGARETTE PAPER

De Manduit Paper Corp., *Pr. Roosevelt,* Havre, 223 cs.
Champagne Paper Corp., *Pr. Roosevelt,* Havre, 235 cs.
H. H. Strauss, *Indep. Hall,* Bordeaux, 11 cs.

WALL PAPER

——, *Aurania,* London, 3 bls., 3 cs.

WALL BOARD

——, *Vingaren,* Gothenburg, 311 bdls., 1 cs.

PAPER HANGINGS

A. E. Nydegger & Co., Inc., *Blommersdyk,* Rotterdam, 1 cs.
W. H. S. Lloyd & Co., *American Trader,* London, 18 bls., 4 cs.

NEWSPRINT

Perkins Goodwin & Co., *Deutschland,* Hamburg, 276 rolls.
——, *Deutschland,* Hamburg, 315 rolls.
Jay Madden Corp., *Deutschland,* Finland, 523 rolls.
National Pulp & Paper Co., Inc., *Pr. Roosevelt,* Oslo, 341 bls., 188 rolls.
Jay Madden Corp., *Pr. Roosevelt,* Finland, 289 rolls.
Jay Madden Corp., *Scanstates,* Kotka, 260 rolls.
N. Y. Evening Journal, *Vingaren,* Kotka, 166 rolls.
Jay Madden Corp., *Vingaren,* Kotka, 160 rolls.
Wilkinson Bros., & Co., Inc., *Vingaren,* Kotka, 54 rolls.
Clinton Paper Corp., *Vingaren,* Hallstavik, 243 rolls.
Boston Paper Board Co., *Vingaren,* Gothenburg, 107 rolls.
Jay Madden Corp., *Hamburg,* Finland, 424 rolls.

PRINTING PAPER

S. H. Pomerance Co., Inc., *Aurania,* London, 2 cs.

WRAPPING PAPER

Yardley & Co., *Aquitania,* Southampton, 6 cs.
F. J. Markwalter & Co., *Deutschland,* Hamburg, 24 cs.
Jay Madden Corp., *Pr. Roosevelt,* Finland, 223 rolls, 10 bls.
American Paper Products Co., Inc., *Pr. Roosevelt,* Finland, 32 rolls.
R. McBratney & Co., Inc., *California,* Glasgow, 1 cs.
Wilkinson Grey & Co., *Vingaren,* Gothenburg, 46 crates.
Lunham & Reeve, Inc., *Vingaren,* Gothenburg, 4 rolls, 16 bls., 265 bdls.
Blauvelt Wilev Paper Manfg. Co., *Vingaren,* Gothenburg, 34 rolls, 10 bls.
——, *Vingaren,* Gothenburg, 312 rolls.
Heemsoth Kerner Corp., *Hamburg,* Bremen, 11 bls.

PACKING PAPER

——, *Pr. van Buren,* Genoa, 100 bls.

FILTER PAPER

H. Reeve Angel & Co., Inc., *Pr. Roosevelt,* Havre, 11 cs., 17 bls.
H. Reeve Angel & Co., Inc., *Aurania,* London, 9 cs.
H. Reeve Angel & Co., Inc., *Aquitania,* Southampton, 10 bls.
——, *Deutschland,* Hamburg, 12 bls.

FILTER MASS

A. W. Fenton, Co., Inc., *Hamburg,* Bremen, 100 bls.

DRAWING PAPER

H. Reeve Angel & Co., Inc., *Aurania,* London, 3 cs.

METAL COVERED PAPER

K. Pauli Co., *Deutschland,* Hamburg, 3 cs.
Winter Wolff & Co., *Blommersdyk,* Rotterdam, 4 cs.
K. Pauli Co., *Hamburg,* Bremen, 18 cs.

SURFACE BARYTA COATED PAPER

Globe Shipping Co., *Deutschland,* Bremen, 70 crates.
L. A. Consmiller, *Hamburg,* Bremen, 10 cs.

BASIC PAPER

Dingelstedt & Co., *Hamburg,* Bremen, 6 cs.

PHOTO PAPER

Heemsoth Kerner Corp., *Deutschland,* Hamburg, 2 cs.
——, *American Trader,* London, 12 cs., (base paper).

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *Samaria,* Liverpool, 13 cs., (duplex), 1 cs., (simplex).

DECALCOMANIAS

Sellers Transportation Co., *Deutschland,* Hamburg, 19 cs.
Sellers Transportation Co., *Hamburg,* Hamburg, 11 cs.

TRANSFER PAPER

Fuchs & Lang Manfg. Co., *Deutschland,* Hamburg, 22 cs.
M. J. Corbett & Co., *Blommersdyk,* Rotterdam, 3 cs.

TISSUE PAPER

F. C. Strype, *American Shipper,* Liverpool, 1 cs.
W. J. Byrnes & Co., *Aquitania,* Southampton, 1 cs., (coated).

AIR MAIL PAPER

B. F. Drakenfeld & Co., *Samaria,* Liverpool, 1 cs.

GUMMED PAPER

Foster & Co., *American Shipper,* Liverpool, 1 cs.

TRACING PAPER

E. Dietzgen & Co., *Hamburg,* Hamburg, 4 cs.

TRACING CLOTH

Keuffel & Esser Co., *American Shipper,* Manchester, 17 cs.

BASIC BOARD

——, *Noordam,* Rotterdam, 5 cs.

MARBLED PAPER

J. MacDonald & Co., *American Trader,* London, 1 cs.

PAPER TUBES

——, *Deutschland,* Bremen, 144 ctns., 9 cs.
——, *Hamburg,* Bremen, 123 ctns., 18 cs.

STRAW BOARD

A. B. Massa Paper Corp., *Noordam,* Rotterdam, 1,272 pkgs.

MISCELLANEOUS PAPER

H. C. Davison & Co., *Asosan Maru,* Yokohama, 6 cs.
F. L. Kramer & Co., *Vingaren,* Gothenburg, 140 bls.
Yardley & Co., *Aquitania,* Southampton, 1 crt.

RAGS, BAGGINGS, ETC.

——, *American Shipper,* Manchester, 55 bls. paper stock.
Loumar Textile By Products, *Pr. Roosevelt,* Hamburg, 60 bls. bagging.
G. W. Millar & Co., Inc., *Blommersdyk,* Rotterdam, 35 bls. bagging.
O'Brien Padawer Co., *Pr. van Buren,* Bombay, 55 bls. cotton waste.
——, *Samaria,* Liverpool, 65 bls. rags, 10 bls. thread waste.
——, *California,* Glasgow, 39 bls. paper stock.
Commercial Bank of Greece, *Exmouth,* Piraeus, 130 bls. rags.
Darmstadt Scott & Courtney, *Gudrun Maersk,* Antwerp, 147 bls. jute waste.

Chase National Bank, *Gudrun Maersk,* Antwerp, 263 bls. bagging.
Richard Shipping Co., *Gudrun Maersk,* Antwerp, 53 bls. rags.
Richard Shipping Co., *Gudrun Maersk,* London, 6 bls. rags.
W. Steck & Co., *Gudrun Maersk,* London, 127 bls. waste string.
Victory Shipping Co., *Gudrun Maersk,* London, 27 bags waste paper.
O'Brien Padawer Co., *Skagerak,* Bombay, 250 bls. cotton waste.
W. Steck & Co., *Excalibur,* Alexandria, 195 bls. rags.
———, *Hamburg,* Hamburg, 217 bags paper stock.
Royal Manfg. Co., *E. Francqui,* Antwerp, 97 bls. cotton waste.
D. M. Hicks, Inc., *Indep. Hall,* Havre, 11 bls. rags.
Brandwein Mazur & Co., *Indep. Hall,* Havre, 59 bls. cotton waste.

HIDE CUTTINGS, ETC.

———, *Samaria,* Liverpool, 556 bags hide cuttings.
———, *Hamburg,* Hamburg, 25 bags bone glue, (sheets).

OLD ROPE

W. Steck & Co., *Noordam,* Rotterdam, 92 coils.
National City Bank, *American Trader,* London, 60 bls.
Chase National Bank, *American Trader,* London, 82 coils.
E. J. Keller Co., Inc., *Indep. Hall,* ———, 141 coils.
W. Steck & Co., *Indep. Hall,* Havre, 69 coils.

CHINA CLAY

English China Clays Sales Corp., *Samaria,* Liverpool, 280 bags.

WOOD PULP

Gottesman & Co., Inc., *Milos,* Hernosand, 3,300 bls. kraft pulp, 550 tons.
Bulkley Dunton Pulp Co., Inc., *Milos,* ———, 1,175 bls. sulphite, 235 tons; 2,925 bls. sulphate, 585 tons.
Bank of N. Y. Trust Co., *Milos,* Hernosand, 8,100 bls. dry sulphite, 1,350 tons.
E. M. Sergeant Pulp & Chemical Co., *Milos,* Hernosand, 900 bls. dry sulphite, 150 tons.
Central Hanover Bank Trust Co., *Milos,* Hernosand, 600 bls. dry sulphite, 100 tons.
Pagel Horton & Co., Inc., *Milos,* Gefle, 3,335 bls. sulphate, 677 tons; 875 bls. sulphite, 177 tons.
Castle & Overton, Inc., *Scanstates,* Helsingfors, 523 bls. unbleached sulphite, 103 tons.
Castle & Overton, Inc., *Ciltvaira,* Tallinn, 640 bls. sulphate, 106 tons.
Bank of N. Y. Trust Co., *Hamburg,* Hamburg, 570 bls. wood pulp, 114 tons.
J. Andersen & Co., *Hamburg,* Hamburg, 60 bls. bleached sulphite, 10 tons.
Price & Pierce, Ltd., *Hein Hoyer,* Soderhamn, 350 bls. unbleached mechanical pulp, 70 tons.
Bulkley Dunton Pulp Co., Inc., *Hein Hoyer,* ———, 2,000 bls. air dry sulphite, 400 tons.
Cellulose Sales Co., Inc., *Hein Hoyer,* Soderhamn, 800 bls. air dry sulphite, 160 tons.
———, *Hein Hoyer,* Hernosand, 10,140 bls. dry sulphate, 1,790 tons; 3,150 bls. airdry sulphite, 651 tons; 6,325 bls. wet sulphite, 1,004 tons.
Chemical Bank Trust Co., *Hein Hoyer,* Hernosand, 1,200 bls. dry sulphite, 200 tons.
Cellulose Sales Co., Inc., *Hein Hoyer,* Sundsvall, 1,680 bls. dry sulphite, 336 tons.

WOOD PULP BOARDS

Jay Madden Corp., *Scanstates,* Helsingfors, 20 bls., 1 cs.
H. Fuchs & Son, *Vingaren,* Gothenburg, 7 bls.
Fibre Case & Novelty Co., *Vingaren,* Gothenburg, 26 bls.
Jay Madden Corp., *Vingaren,* Kotka, 2 bls., 107 rolls.
W. Bersch, *Hamburg,* Hamburg, 200 bls.

NEWARK IMPORTS

WEEK ENDING MARCH 4, 1939

———, *Astrid,* Sheet Harbor, N.S., 1,147 bls. wood pulp screenings, 2,166 bls. wood pulp.

PORTLAND IMPORTS

WEEK ENDING MARCH 4, 1939

J. Andersen & Co., *Hein Hoyer,* Sundsvall, 17,010 bls. kraft sulphate, 2,835 tons.

BOSTON IMPORTS

WEEK ENDING MARCH 4, 1939

Castle & Overton, Inc., *Ciltvaira,* Tallinn, 320 bls. sulphate, 53 tons.
———, *Ciltvaira,* Tallinn, 500 bls. sulphite, 100 tons.
———, *Blommersdyk,* Rotterdam, 14 bls. rags.

PHILADELPHIA IMPORTS

WEEK ENDING MARCH 4, 1939

———, *Astrid,* Sheet Harbor, N. S., 2,166 bls. wood pulp.
Neidich Process Co., *Vingaren,* Kotka, 24 bbls. tissue paper.
Public Ledger, Inc., *Vingaren,* Kotka, 476 rolls newsprint.
J. W. Hampton, Jr. & Co., Inc., *Vingaren,* Kotka, 24 bls. printing paper; 90 rolls newsprint.
Wilkinson Bros., & Co., Inc., *Vingaren.* Kotka, 176 rolls newsprint.
Jay Madden Corp., *Vingaren,* Kotka, 709 rolls wood pulp boards.
Gilman Paper Co., *Vingaren,* Hallstavik, 772 rolls newsprint.
Perkins Goodwin & Co., *Vingaren,* Gothenburg, 279 bls. sulphate.
J. Andersen & Co., *Vingaren,* Gothenburg, 125 bls. bleached sulphite.
Stora Kopparberg Corp., *Vingaren,* Gothenburg, 375 bls. chemical pulp.
———, *Vingaren,* Gothenburg, 263 bdls. wall boards.
Salwen Paper Co., *Vingaren,* Gothenburg, 15 bls. wood pulp boards.
The Borregaard Co., Inc., *Vingaren,* Gothenburg, 66 rolls, 36 bls. paper.
Gottesman & Co., Inc., *Exmouth,* Constanza, 2,800 bls. bleached pulp, 561 tons.
Commercial Bank of Greece, *Exmouth,* Piraeus, 493 bls. rags.
E. J. Keller Co., Inc., *Indep. Hall,* ———, 398 bls. rags.
Price & Pierce, Ltd., *Tijuca,* ———, 500 bls. bleached sulphite.
Bulkley Dunton Pulp Co., Inc., *Hein Hoyer,* ———, 1,150 bls. airdry sulphate, 230 tons.
———, *Hein Hoyer,* Hernosand, 3,575 bls. wet sulphite, 566 tons; 552 bls. airdry sulphite, 92 tons.
Parsons & Whittemore, Inc., *Hein Hoyer,* Sundsvall, 172 rolls newsprint.
Cellulose Sales Co., Inc., *Hein Hoyer,* Sundsvall, 400 bls. dry chemical pulp, 49 tons; 1,750 bls. dry sulphite, 355 tons.

WILMINGTON IMPORTS

WEEK ENDING MARCH 4, 1939

———, *Astrid,* Sheet Harbor, N. S., 3610 bls. wood pulp.
Price & Pierce, Ltd., *Malaren,* ———, 600 bls. bleached sulphate.

BALTIMORE IMPORTS

WEEK ENDING MARCH 4, 1939

Congoleum Nairn Co., *Estrella,* Marseilles, 693 bls. rags.
Jay Madden Corp., *Scanstates,* Kotka, 1,485 rolls newsprint.
Pulp Sales Corp., *Scanstates,* Kotka, 857 bls. sulphate, 143 tons.
F. H. Shallus, Co., *Vingaren,* Kotka, 165 rolls newsprint.
Whitaker Paper Co., *Vingaren,* Kotka, 110 rolls newsprint.
Jay Madden Corp., *Vingaren,* Kotka, 1,374 rolls newsprint.
Pulp Sales Corp., *Vingaren,* Kotka, 500 bls. bleached sulphite.
Washington News, *Vingaren,* Hallstavik, 615 rolls newsprint.
Nolan Bowmall & Co., Inc., *Vingaren,* Gothenburg, 66 rolls newsprint.
Parsons & Whittemore, Inc., *Vingaren,* Gothenburg, 38 rolls newsprint.
———, *Vingaren,* Gothenburg, 69 bdls. wall board.
Congoleum Nairn Co., *Indep. Hall,* Bordeaux, 414 bls. rags.
Congoleum Nairn Co., *Indep. Hall,* Havre, 56 bls. rags.
S. Shapiro & Sons, *Indep. Hall,* Havre, 63 bls. rags.

NORFOLK IMPORTS

WEEK ENDING MARCH 4, 1939

H. H. Strauss, *Indep. Hall,* Bordeaux, 198 cs. cigarette paper.
American Tobacco Co., *Indep. Hall,* Bordeaux, 537 cs. cigarette paper.
R. J. Reynolds Tobacco Co., *Indep. Hall.* St. Nazaire, 1,373 cs. cigarette paper.
Gottesman & Co., Inc., *Malaren,* Sweden, 2,735 bls. wood pulp.

NEWPORT NEWS IMPORTS

WEEK ENDING MARCH 4, 1939

Pulp Sales Corp., *Scanstates,* Kotka, 5,000 bls. sulphate, 1,000 tons.
De Manduit Paper Corp., *Indep. Hall,* Havre, 824 cs. cigarette paper.
Price & Pierce, Ltd., *Malaren,* ———, 3,000 bls. unbleached sulphite; 3,360 bls. unbleached sulphate; 540 bls. bleached sulphate.

NEW ORLEANS IMPORTS

WEEK ENDING MARCH 4, 1939

R. Blank, *Livenza,* Algiers, 75 bls. rags.

LATEST MARKET REVIEW

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, March 8, 1939.

Activity in the wholesale paper market is reported by many manufacturers' representatives, jobbers, and wholesale paper merchants, as a little less for the current week. Although the general and wide consumer demand for paper and paper products continues to maintain a relatively high volume in comparison with many other commodities and consumer goods, the present recession in general business activity is being felt in the paper trade.

The index of general business activity stood at 88.0 per cent for the week ended February 25, compared with 88.8 per cent for the preceding week, and with 78.8 per cent for the corresponding period last year. Production of over two hundred paper mills is estimated at 76.9 per cent for the week ended February 25, compared with 82.4 per cent for the previous week, and with 71.3 per cent for the corresponding week last year. Paper board production for the corresponding period stood at 68.0 per cent, compared with 61.0 per cent for the week ended February 26 last year.

The newsprint situation is unchanged for the week. Consumption is slowly increasing and more activity is looked for in the latter part of the month as general business activity improves. Prices are firm and unchanged.

The wholesale paper market is a little less active for the week and consumer demand for all grades of paper is slightly under that of last week. The decline in volume of sales to the printing industry is responsible for the lagging activity in many grades of paper. The sales of commercial printing is estimated at 25 per cent below normal, the decline in volume in January was nearly 5 per cent below sales in December, and approximately 15 per cent below sales in 1937.

The kraft paper market is rather quiet and no noteworthy change in production or sales has been reported this week. The price situation is fairly satisfactory and considerably improved over that of the same period last year, and less price concession in bag kraft paper have been reported. Prices remain unchanged.

The demand for paper board continues fairly good, considering the quietness prevailing in other divisions of the paper trade. Production is being well maintained and prices are quite firm and unchanged in the metropolitan area.

Mechanical Pulp

The demand for mechanical pulp continues on the level of the preceding week. Prices are firm and unchanged at prevailing market quotations.

Chemical Pulp

No change in demand for chemical pulp has occurred this week and this market is relatively quiet. Prices on some grades of pulp have been shaded a little this week, the reduction ranging up to about $2 per ton in easy bleaching sulphite and about $1 per ton on No. 1 and No. 2 kraft pulps.

Old Rope and Bagging

No noteworthy change has taken place in the old rope market and business continues light. Prices hold steady and no changes have been reported. Old bagging continues moving in light volume, with only the roofing grades showing much activity. Prices are firm and unchanged.

Rags

No change has been reported in the rag market for the week, excepting in the prices of domestic roofing rags which are a little lower; No. 1 roofing rags being currently quoted at from $1.05 to $1.10; No. 2, at from .85 to .90; No. 3, (bagging) at from .55 to .65; No. 4 and 5 at from .60 to .65 per cwt. The foreign rag market is inactive and prices continue nominal.

Old Waste Paper

Since the recent rise in the prices of some grades of old waste paper, particularly in the increase in No. 1 mixed paper, prices continue firm and this market is steady.

Twine

The twine market reports business as rather quiet for this week. Mill prices continue firm and unchanged, despite the reports of some concessions being made in resale prices.

Carruthers and Kellogg Get Gifts

As a token of high esteem and appreciation for the many years of service rendered as members of the Joint Textbook Committee of the Paper Industry of the United States and Canada, the Technical Association of the Pulp and Paper Industry, and the Canadian Pulp and Paper Association, has presented to George Carruthers, president of the Interlake Tissue Mills Company, Toronto, Canada, and to R. S. Kellogg, secretary-treasurer, of the Newsprint Service Bureau, 342 Madison avenue, New York, a specially bound, five volume set of the Manufacture of Pulp and Paper. The handsome volumes are richly bound in red morocco leather and cloth, gilt tops, and with the recipients' names imprinted in gold on the covers. Mr. Kellogg received the gift a short time before he left with Mrs. Kellogg, on March 7, for a vacation of two weeks in Florida.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, March 8, 1939.

BLANC FIXE—Quotations on blanc fixe are firm and unchanged at prevailing market levels. The pulp is quoted at from $42.50 to $45 per ton, in bulk; the powder is offered at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—Prices on bleaching powder continue firm and conform to prevailing market quotations. Bleaching powder is quoted at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The demand for casein is reported as improved for the current week. Standard domestic casein, 20-30 mesh, is quoted at 8½ cents per pound; 80-100 mesh at 9 cents per pound. All prices in bags, car lot quantities.

CAUSTIC SODA—Quotations on caustic soda remain unchanged at prevailing market prices. Solid caustic soda is quoted at from $2.10 to $2.30 per 100 pounds; flake and ground at from $2.50 to $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Prices on china clay continue firm and unchanged at prevailing market levels. Imported clay is quoted at from $13 to $25 per ton, ship side. Domestic filler clay is offered at from $6.50 to $12 per ton; coating clay at from $11 to $22 per ton, at mines.

CHLORINE—Quotations on chlorine are firm and unchanged at prevailing market levels. Chlorine is quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The demand for rosin is reported fair for the week. "G" gum rosin is quoted at $5.25; "F" wood rosin at $4.30, per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent gum rosin size is quoted at $2.83 per 100 pounds, f.o.b., shipping point.

SALT CAKE—Quotations on salt cake are firm and unchanged. Prices range at from $12 to $13.50 per ton; chrome salt cake at from $11 to $12 per ton, f.o.b., shipping point. Imported salt cake is offered at from $14.50 to $15 per ton, Gulf or Atlantic Seaboard, on dock.

SODA ASH—Prices on soda ash are unchanged and conform to prevailing market levels. Quotations on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.05; and in barrels, $1.35.

STARCH—Quotations on corn starch continue relatively firm and are unchanged at prevailing market levels. Globe pearl is quoted at $2.50 per 100 pounds; special paper starch is quoted at $2.60 per 100 pounds. All prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Prices on sulphate of alumina are unchanged at prevailing market quotations. The commercial grades are quoted at $1.15; iron free at $1.30, per 100 pounds, in bags, car lot quantities, f.o.b., works.

SULPHUR—Quotations on sulphur continue firm and conform to prevailing market prices. Annual contracts are quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are offered at $19 per ton.

TALC—Prices on talc are firm and unchanged for the week. Domestic talc is quoted at from $15 to $18 per ton, Eastern mines. Imported talc is offered at from $25 to $40 per ton, on dock.

Market Quotations

Paper

(Delivered New York)

News, per ton—
Roll, contract....$50.00 @ —
Sheets .....58.00 @ —

Kraft—per cwt.—Delivered Zone A
No. 1 Northern....$4.75 @$5.25
Superstandard .... 4.12½ @ 4.62½
Northern Standard Wrapping ..... 4.00 @ —
Standard Wrapping 3.50 @ —

Tissues—Per Ream—Carlots
White No. 1..... .92½ @ —
White No. 1 M. G. .90 @ —
White No. 1½.... .67½ @ —
White No. 2..... .60 @ —
Anti-Tarnish M. G. .75 @ —
Colored ..... .87½ @ —
Kraft ..... .75 @ —
Manila ..... .60 @ —
Unbl. Toilet, 1 M.. 3.20 @ —
Bleached Toilet.... 5.26 @ —

Paper Towels—
Unbleached ..... 1.80 @ —
Bleached ..... 2.10 @ —

Manila—per cwt.—C. l. f. a.
No. 1 Jute..... 8.25 @ 9.75
No. 2 Jute..... 7.50 @ 9.00
No. 1 Manila Wrapping, 35 lb..... 5.00 @ —
No. 2 Manila Wrapping, 35 lb..... 4.75 @ —

Boards, per ton—
News .....27.50 @30.00
Chip .....27.50 @30.00
Sgl. Mla. Ll. Chip.42.50 @ —
Jute Lined Chip...42.50 @45.00
White Pat. Coated.55.00 @57.50
Kraft Liners.....42.50 @45.00
Binders Boards....71.00 @77.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1.	$39.10@$46.00	$40.25@$47.25
100% Rag	31.05@ 36.50	32.20@ 37.75
85% Rag	.....	29.90@ 35.00
75% Rag	23.60@ 27.75	24.75@ 29.00
65% Rag	.....	21.65@ 26.25
50% Rag	17.55@ 21.50	18.70@ 22.75
25% Rag	14.65@ 17.75	15.80@ 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
No. 1...	$8.60@$10.50	$9.75@$12.00
No. 2...	7.70@ 9.50	8.90@ 10.75
No. 3...	6.85@ 8.25	8.00@ 9.75
No. 4...	6.45@ 7.75	7.60@ 9.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper.

Delivered in Zone 1

No. 1 Glossy Coated...	$11.30@$12.75
No. 2 Glossy Coated...	9.70@ 11.00
No. 3 Glossy Coated...	8.60@ 10.00
No. 4 Glossy Coated...	8.05@ 9.25
No. 1 Antique (watermarked)	8.05@ 9.25
No. 2 Offset.....	7.45@ 8.50
A Grade E. F.....	7.20@ 8.25
A Grade S. & S. C....	7.45@ 8.50
B Grade E. F.....	6.65@ 7.75
B Grade S. & S. C....	6.90@ 8.00
C Grade E. F.....	6.40@ 7.50
C Grade S. & S. C....	6.65@ 7.75
D Grade E. F.....	6.10@ 7.00
D Grade S. & S. C....	6.35@ 7.25

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—
Moist .....25.00 @28.00
Dry .....25.00 @28.00

(Delivered)

No. 1 Domestic and Canadian .....29.00 @33.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—
Prime Bleached Sulphite ..... 2.25 @ 2.75

Prime Qualities—
Easy-Bleaching Sulphite ..... 1.90 @ 2.00
Strong Unbleached Sulphite ..... 1.80 @ 1.95

(On Dock, Atlantic Ports)

Kraft Bleached..... 2.50 @ 2.75
Kraft Light & Strong 1.60 @ 1.75
Kraft No. 1..... 1.45 @ 1.60
Kraft No. 2..... 1.35 @ 1.40

(F. o. b. Pulp Mill)

Kraft Domestic..... 1.25 @ 1.75

(Delivered)

Soda Bleached..... 2.55 @ —

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—
New White, No. 1. 6.80 @ 7.00
Silesias No. 1..... 4.00 @ 4.25
New Unbleached... 6.50 @ 6.75
Blue Overall..... 4.90 @ 5.00
Fancy ..... 2.00 @ 2.15
Washables ..... 1.50 @ 1.60
Mixed Khaki Cuttings ..... 3.00 @ 3.25
O. D. Khaki Cuttings 4.00 @ 4.10

Old Rags

White, No. 1—
Repacked ..... 2.90 @ 3.15
Miscellaneous ..... 2.10 @ 2.25

White, No. 2—
Repacked ..... 1.50 @ 1.60
Miscellaneous .... 1.25 @ 1.40

Thirds and Blues—
Repacked ..... 1.30 @ 1.40
Miscellaneous ..... 1.15 @ 1.20

Roofing Rags—
No. 1..... 1.05 @ 1.10
No. 2..... .85 @ .90
No. 3 (bagging).. .55 @ .65
No. 4..... .60 @ .65
No. 5A..... .60 @ .65

Foreign Rags

New Rags

New Dark Cuttings.. 2.25 @ 2.40
New Mixed Cuttings. 2.00 @ 2.20
New Light Silesias.. 5.50 @ 5.75
Light Flannelettes... 5.50 @ 5.75
New White Cuttings. 7.00 @ 7.50
New Light Oxford.. 4.00 @ 4.50
New Light Prints... 3.00 @ 3.25

Old Rags

No. 1 White Linens. 7.50 @ 8.50
No. 2 White Linens. 6.50 @ 7.50
No. 3 White Linens. 4.50 @ —

HIGHEST QUALITY CLAYS

LUMP and POWDERED } IMPORTED

EASTON, PENNSYLVANIA, U.S.A. PAPER MAKERS IMPORTING CO., INC.

DOMESTIC { CRUDE CRUSHED, AIR FLOATED, WATER WASHED

PRECIPITATED CALCIUM CARBONATE

Pure Titanium Dioxide

ZOPAQUE RG

a New Development

giving maximum suspension and dispersion in water, assuring high efficiency and value.

The opacity and brightness of ZOPAQUE will produce an exceptional paper for you. . . . .

Try it!

Sole Selling Agents:
The Chemical & Pigment Company
Baltimore, Md. · Collinsville, Ill. · Oakland, Calif.
Manufactured by
American Zirconium Corporation
Baltimore, Maryland

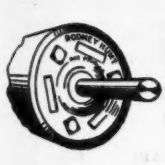
EXCELSIOR FELTS

a product of

THE KNOX WOOLEN CO.
CAMDEN MAINE

DISTRIBUTED SINCE 1864 BY

BUCKLEY DUNTON & CO.
295 MADISON AVE. NEW YORK N. Y.
CAledon. 5-5260 to 69



FELT ROLL HISTORY!

is being written in paper mills by Rodney Hunt's

"SHAF-TITES"

Patented head construction that prevents loose shafts. Low cost. End roll troubles by writing today.

Also
Water Power Machinery
Canal Gates and Gate Hoists
Tanks, Vats, etc.

RODNEY HUNT
Machine Company
38 Maple St. Orange, Mass.

WATERBURY FELTS

Are Made By

H. WATERBURY & SONS CO.
ORISKANY, NEW YORK

No. 4 White Linens.	2.25	@	3.25
No. 1 White Cotton.	4.25	@	4.75
No. 2 White Cotton.	3.25	@	3.75
No. 3 White Cotton.	2.50	@	3.00
No. 4 White Cotton.	1.90	@	2.20
Extra Light Prints..	2.00	@	2.40
Ord. Light Prints...	1.75	@	2.15
Med. Light Prints...	1.55	@	1.95
Dutch Blue Cottons.	2.25	@	2.50
French Blue Linens..	3.00	@	—
Checks and Blues...	2.00	@	—
Linsey Garments....	1.90	@	2.00
Dark Cottons.....	1.50	@	1.60
Old Shopperies.....	1.30	@	1.45
New Shopperies.....	1.45	@	1.50
French Blues.....	2.25	@	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.75	@	1.90
Domestic	1.70	@	1.80
Wool Tares, light....	1.60	@	1.70
Wool Tares, heavy...	1.80	@	1.90
Bright Bagging.....	1.60	@	1.70
Manila Rope—			
Foreign	2.60	@	2.75
Domestic	2.00	@	3.00
Jute Threads.....	2.75	@	3.00
Sisal Strings.....	1.50	@	1.60
Mixed Strings.....	.55	@	.60

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.30	@	2.40
Ordinary Hard White No. 1....	1.90	@	2.00
Soft White No. 1..	1.60	@	1.75
Soft White Extra..	2.25	@	2.40
Flat Stock—			
Stitchless	.80	@	.85
Overissue Mag.....	.70	@	.75
Solid Flat Book...	.55	@	.60
Crumbled No. 1...	.40	@	.45
Ledger Stock White.	1.10	@	1.20
Ledger Stock Colored	.60	@	.70
New B. B. Chips....	.15	@	.20
Manila—			
New Env. Cut.....	1.40	@	1.50
New Cuttings.....	1.00	@	1.20
Old Kraft Machine—			
Compressed bales..	.60	@	.65
News—			
No. 1 White News	1.25	@	1.30
Strictly Overissue..	.40	@	.45
Strictly Folded.....	.37½	@	.42½
No. 1 Mixed Paper..	.17½	@	.22½

Twines

(F. o. b. Mill)
(Soft Fiber)

Coarse Polished—			
India	.12¼	@	.14¼
White Hemp.....	.13¾	@	.15¼
Fine Polished—			
Fine India.....	.16	@	.18
Unpolished—			
Box	.09½	@	—
Paper Makers.....	.09½	@	.10½
Tube Rope.....	.10¼	@	.12½
Wall Paper.....	.10¼	@	.12½
Wrapping	—	@	—
Soft Fiber Rope...	.12	@	.14
Cotton	.17	@	.20
(Hard Fiber)			
Medium Java.....	.11	@	.17
Mex. Sisal.....	.10	@	.16
Manila	.16	@	.23

Domestic	2.65	@	2.75
Sisal Rope.....	1.60	@	1.65
Mixed Rope.....	.40	@	.50
Transmission Rope...	1.90	@	2.00
Soft Jute Rope.....	1.80	@	2.00
Jute Carpet Threads.	.75	@	.90
Gunny Bagging—			
Foreign	1.65	@	1.75
Domestic	1.50	@	1.60
Bleachery Burlap...	2.50	@	3.00
Scrap Burlap—			
Foreign	1.55	@	1.65
Domestic	1.25	@	1.40
Scrap Sisal.....	1.25	@	1.40
Scrap Sisal for Shredding	1.75	@	2.00
Wool Tares, Heavy..	1.50	@	1.60
New Burlap Cuttings	2.00	@	2.25
Aust. Wool Pouches.	2.50	@	3.00
Heavy baling bagging	1.75	@	1.85
Paper Mill Bagging..	1.00	@	1.15
No. 2 Bagging.....	.50	@	.70

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints...	.03¼	@	.03½
New White No. 1...	.06¾	@	.07
New Light Flannelettes	.04½	@	—
Silesias No. 1.....	.04¾	@	—
New Black Silesias..	.03¾	@	.04
Soft Unbleached.....	6.50	@	7.00
Blue Cheviots.....	.05	@	.05¼
Fancy	.03	@	.03¼
Washable	.02¾	@	.03
Cottons—According to grades—			
Blue Overalls.....	.04¾	@	.05
New Black, soft...	.03¾	@	.04
Khaki Cuttings.....	.03	@	.03½
O. D. Khaki.....	.04	@	—
Corduroy	.02¾	@	.03
New Canvas.....	.06¾	@	.07½
B. V. D. Cuttings...	.06¾	@	—

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues.....	1.75	@	2.00
Old Blue Overalls...	1.50	@	—
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings.....	3.90	@	4.00
Roofing Stock—			
No. 1.....	1.00	@	1.10
No. 2.....	.75	@	.85
No. 3.....	.65	@	.70

Foreign Rags

(F. o. b. Boston)

Dark Cottons.....	1.00	@	1.10
Dutch Blues.....	2.65	@	2.75
New Checks and Blues	2.85	@	3.00
Old Fustians.....	2.25	@	2.50
Old Linsey Garments	2.20	@	2.25
New Silesias.....	4.50	@	4.75

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1.	.06½	@	.07
New White, No. 2.	.03½	@	.04
Light Silesias.....	.03½	@	.04
Silesias, No. 1....	—	@	.04½
Black Silesias, soft	—	@	.03
New Unbleached..	.05½	@	.06
Washable, No. 1..	.01½	@	.01¾
Blue Overall.....	.04	@	.04½
Cottons—Acording to grades—			
Washable No. 2...	.01	@	.01¼
New Blue.....	.01	@	.01¼
Fancy Percales....	—	@	.02½
New Black Soft...	.03	@	.03½
New Light Seconds	—	@	.04½
New Dark Seconds	.50	@	.75
Khaki Cuttings—			
No. 1 O. D.....	.03	@	.03½
No. 2 Mixed.....	.02	@	.02¼
Corduroy	—	@	.02
New Canvas.....	.05	@	.05½
New Black Mixed.	.02¼	@	.02¾

Domestic Rags (Old)

White No. 1—			
Repacked	3.00	@	3.25
Miscellaneous	2.50	@	2.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.25
Repacked	1.50	@	1.75
Black Stockings (Export)	3.00	@	3.50
Roofing Stock—			
Foreign No. 1....	—	@	1.10
Domestic No. 1...	—	@	1.00
Domestic No. 2...	—	@	.75
Roofing Bagging..	—	@	.65

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.75	@	2.00
Domestic	1.50	@	1.75
Manila Rope.....	—	@	3.50
Sisal Rope.....	1.50	@	1.75
Mixed Rope.....	.75	@	1.00
Scrap—			
No. 1.....	—	@	1.75
No. 2.....	1.00	@	1.25
Wool Tares, heavy..	3.25	@	3.50
Mixed Strings.....	.75	@	1.00
No. 1 New Light Burlap	2.50	@	3.00
New Burlap Cuttings	1.75	@	2.00

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White.	2.25	@	2.30
No. 2 Hard White.	1.90	@	2.00
No. 1 Soft White..	1.75	@	1.80
No. 2 Soft White..	1.30	@	1.40
No. 1 Mixed.....	.65	@	.75
Solid Ledger Stock..	1.45	@	1.50
Ledger Stock, white.	1.15	@	1.20
Ledger Stock, colored	.75	@	.80
No. 1 Books, heavy..	.60	@	.75
Manila Cuttings.....	1.45	@	1.50
Print Manila.....	.40	@	.45
Container Manila....	.35	@	.40
Kraft Paper.....	.75	@	.80
No. 1 Mixed Paper..	.20	@	.25
Straw Board Chip...	.25	@	.30
Binders Board Chip.	.25	@	.30
Corrugated Board...	.50	@	.55
Overissue News.....	.40	@	.45
Old Newspapers.....	.35	@	.40

BOSTON

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White..	1.85	@	2.15
No. 2 Mixed.....	.75	@	.80
Solid Ledger Books..	1.30	@	—
Overissue Ledger Stock	1.30	@	1.50
Mixed Ledgers.....	.85	@	.90
No. 1 Books, heavy..	.65	@	.75
No. 1 Books, light...	.65	@	.75
Crumpled Stitchless Book Stock.....	.55	@	.65
Manila Env. Cuttings	1.70	@	1.85
Manila Envelope Cuttings, Extra Quality	1.90	@	2.00
No. 1 Old Manila...	.65	@	.65
No. 1 Old Manila...	.80	@	.90
White Blank News..	1.30	@	1.40
No. 1 Kraft.....	.80	@	.85
Mixed Papers.....	.15	@	—
Print Manila.....	.45	@	.55
Container Manilas...	.27½	@	—
Old Newspapers.....	.25	@	.32½
Paper Wool Strings..	.50	@	.65
Overissue News.....	.45	@	.50
Box Board Chips....	.20	@	.25
Corrugated Boxes....	.25	@	.30
Kraft corrugated boxes	.60	@	.70
Screening Wrappers..	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	2.65	@	2.75

CHICAGO

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings....	1.80	@	1.90
No. 1 Hard White.	1.70	@	1.80
No. 1 Soft White..	1.50	@	—
Ledger & Writings..	.75	@	.80
Solid Books.....	.45	@	.50
Blanks	.90	@	—
Krafts	.45	@	.50
New Kraft Cuts.....	1.10	@	—
Manila Env. Cuts...	Nominal		
Ex. No. 1 Manila...	Nominal		
Print Manila.....	Nominal		
Overissue News.....	.35	@	—
Old Newspapers—			
No. 1 Folded News	.25	@	.30
No. 1 Mixed Paper	.15	@	.20
Roofing Stocks—			
No. 1.....	1.00	@	1.05
No. 2.....	.85	@	—

TORONTO

Paper

Bonds

Direct mill shipment in two-ton lots

No. 1 White $35.50		@	—
No. 1 Tints 36.50		@	—
No. 2 White 25.50		@	—
No. 2 Tints 26.50		@	—
No. 2 Golden Rod.. 27.50		@	—
No. 3 White 21.00		@	—
No. 4 White 15.00		@	—
No. 4 Tints 16.00		@	—
No. 4 Golden Rod.. 17.00		@	—

Direct mill shipment in three-ton lots

No. 5 White $10.50		@	—
No. 5 Tints 11.50		@	—
No. 5 Golden Rod.. 12.00		@	—
No. 6 White 9.00		@	—
No. 6 Tints 9.50		@	—
No. 6 Golden Rod.. 11.00		@	—
No. 7 White 8.00		@	—
No. 7 Tints 8.50		@	—
No. 7 Golden Rod.. 10.00		@	—
Book—			
No. 1 M. F. $7.00		@	—
No. 2 M. F. 6.50		@	—
No. 3 M. F. 5.25		@	—
No. 1 S. C. 7.25		@	—
No. 2 S. C. 6.75		@	—
No. 3 S. C. 5.75		@	—

Coated Book & Litho

Ton Lots (resale)

No. 1 .....$12.00		@	—
No. 2 ..... 10.25		@	—
No. 3 ..... 8.90		@	—
Coated tinted 13.00		@	—
Wrapping—delivered—			
Rag Brown.....	4.85	@	5.25
White Wrap.....	4.00	@	—
"B" Manila.....	4.90	@	6.15
No. 1 Manila.....	5.50	@	6.90
Fiber	5.50	@	6.90
Kraft No. 2.....	5.50	@	6.90

(F. o. b. Cars, Toronto)

News per ton—			
Rolls (contract)...46.00		@	—
Sheets 54.00		@	—

Pulp

Ground wood.....29.50		@	—
Bleached sulphite....54.00		@	—
Unbleached sulphite..44.00		@	—
Kraft 50.00		@	—
Soda 51.00		@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut...	2.15	@	—
Soft White.....	1.90	@	—
White Blk. News..	1.25	@	1.10
Book and Ledger—			
Flat Magazine and Book Stock (old)	.70	@	—
Light and Crumpled Book Stock.	.60	@	—
Ledgers and Writings	1.00	@	—
Manilas—			
New Manila Cut..	1.35	@	—
Printed Manilas...	.45	@	—
Kraft	.95	@	—
News and Scrap—			
Strictly Overissue..	.50	@	—
Strictly Folded....	.45	@	—
No. 1 Mixed Paper..	.30	@	—

Domestic Rags

(Price to Mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.06½	@	.06¾
Fancy Shirt Cuttings	.02¼	@	.03½